**The Cross Between Health, Nutrition,**

**and Sustainability in the Dairy Industry:**

**A Focus Group**

**INTRODUCTION**

 According to the 2015 Scientific Report of the Dietary Guidelines Advisory Committee (DGAC), a notable shift has occurred in human consumption of fluid cow’s milk to non-dairy alternatives, such as nut, soy, and rice-based drinks (1). While vegetarian and vegan diets devoid of cow’s milk have been shown to be adequate if well planned, intake of key nutrients generally found in the greatest percentage within cow’s milk is low in the US population (2). An 8-oz. glass of low-fat or fat-free milk provides 8 grams of quality protein alongside a multitude of vitamins and minerals, including calcium, vitamin D, vitamin A, phosphorus, potassium, riboflavin, niacin, vitamin B12, iron, and magnesium (2). Studies show that it is difficult to gain this same package of nutrients from dairy-free alternatives, likely requiring unrealistically large servings and excess calories (1).

 Misconceptions surrounding dairy from both nutrient and production perspectives are likely to have contributed to the decline in dairy consumption over the years and a failure to meet the Dietary Guidelines for Americans (DGA) recommendations of 3 servings of dairy products per day for adults. Media and other outlets often present the dairy industry in a poor light, focusing on sustainability issues such as the carbon footprint or animal welfare. In reality, this is not a factual representation of the industry that local dairy farmers are contributing to. The significant influence that media can have over public perception, both at the levels of the general community and health professional, is sometimes difficult to dispel as trends towards what individuals feel is “healthiest” tend to gain support rapidly, regardless of existing scientific evidence.

 More and more, consumers turn towards dietetics professionals as the “experts” to provide accurate facts either supporting or dispelling these trends. It is important that nutrition students are well-educated regarding efforts towards sustainability in all aspects of the food industry, rather than simply the human nutritional science backing recommendations. With regards to dairy, necessary knowledge includes nutritional aspects of dairy, but also aspects of production and processing, the difference between organic and conventional, and what dairy farmers are continuing to do to reduce their carbon footprint (3).

 According to the Food and Agriculture Organization (FAO) of the United Nations and Biodiversity International, sustainable diets are defined as:

“… diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe, and healthy; while optimizing natural and human resources.” (3)

In other words, human health and ecosystems are truly interconnected entities, and thus as dietetics practitioners, having knowledge of both appears advantageous for providing accurate recommendations. For dairy specifically, sustainability includes providing a nutritious good to consumers in “a way that it economically viable, environmentally sound, and socially responsible – now and for future generations” (3).

**NEEDS ASSESSMENT**

 The New England Dairy & Food Council (NEDFC) is a non-profit organization that was established in 1920 by the New England dairy farmers. Staffed entirely by registered dietitians, the goal of the NEDFC is to promote health and nutritional benefits of dairy products in an evidence-based manner (4). Roughly 1,500 New England dairy farm families in total fund the NEDFC, rather than large cooperatives, in part due to their desire to foster the movement towards supporting local agriculture. (4) For every 100 pounds of milk produced and sold, 15 cents is donated – 10 cents to the National Dairy Council and 5 cents to the New England Dairy & Food Council (4). These donated funds are what regional dairy council chapters, like the NEDFC, are able to run off of in order to support their mission nationwide.

 The primary focus of the NEDFC is to tackle childhood obesity in schools by promoting healthy eating – particularly school breakfast – and physical activity among children and adolescents (4). Fuel Up to Play 60 (FUTP60) is a partnership formed between the National Dairy Council and the National Football League, in collaboration with the USDA, with this focus in mind (4). At primary and secondary school events, partnerships are brought to light, such as the camaraderie between our football players and local dairy farmers, as a representative from each sit before the students and speak about the importance of fueling up with breakfast. NEDFC has expanded the possibilities for school nutrition professionals and educators when considering how to increase breakfast participation in their respective institutions. Some such examples include Grab and Go carts, Breakfast in the Classroom, and Smoothie Bars, all incorporating low-fat and fat-free dairy products (4).

 A second focus of the NEDFC goes beyond the classroom to what is referred to as “Nutrition Affairs,” encompassing issues of sustainability, food security, and community connections to local agriculture (4). Included in the term “community connections” are the various partnerships that are vital for the work that the NEDFC is able to accomplish. National partners include the Academy of Nutrition and Dietetics, the American Academy of Pediatrics, the School Nutrition Association, and Feeding America. Additionally, local partners include physicians from Boston Children’s Hospital and Massachusetts General Hospital, school superintendents and food service directors, and a multitude of registered dietitians. By educating these target groups about the health benefits of dairy via science-based presentations and resources, NEDFC is able to reach not only the community, but also professionals who have a great impact over community decision-making at the governmental level. Interactive meetings held directly on local dairy farms have proven useful for fostering partnerships, recognizing that direct exposure to where dairy comes from truly resonates more than simple word of mouth (4).

 With children and adolescents as the target population, through such aforementioned programs as Fuel Up to Play 60 and the Massachusetts School Breakfast Challenge, the college-aged population has not been priority. Studies show that dairy consumption declines in young adults and college-aged individuals, both male and female (5-7). Suggested reasons for a decline in consumption include expense, taste preferences, storage problems, health perceptions, lack of perceived osteoporotic risk, and/or environmental sustainability perceptions (6, 7). The 2015 Scientific Report of the Dietary Guidelines Advisory Committee (DGAC) states that future research is needed in adolescents (grades 9-12), as most research focuses on children (grades K-8) (1). Also, both Vitamin D and Calcium are under consumed nutrients of public health concern for skeletal health in preventing osteoporosis (1).

 Interestingly, studies also show that even college students studying nutrition and dietetics or other health sciences are not always meeting the Dietary Guidelines for Americans (DGA) recommendations of 3 servings of dairy per day (8, 9). If these individuals, some of whom will one day be registered dietitians in the field, are not meeting recommendations due to a lack of knowledge or conflicting motivators, then there may be cause for concern regarding how future conversations with clients/patients will resolve.

 The knowledge I received during my first week with the NEDFC was vast. As a dietetics student, I knew the importance of dairy primarily from a human nutrition standpoint. If these facts I was receiving were brand new to me, my assumption was that they would be new to my classmates as well. Early as an intern, I began consciously increasing my own dairy consumption, recognizing the difference between cow’s milk and dairy alternatives in a new way, as well as the impact adequate consumption can have on my quality of life.

 Coursework at Simmons College within the Nutrition & Dietetics curriculum includes a balance of both community and clinical aspects, meeting the core competencies required by ACEND (12). However, coursework focused on agricultural sustainability is limited beyond the courses, “Community Nutrition” and “Advanced Food Science.” This is not necessarily the case for dietetics programs at US institutions *outside* of urban areas. For example, the University of New Hampshire (UNH) has a dual major in Nutrition & Wellness and Ecogastronomy, with extensive experiential learning opportunities on nearby farms (11). Additionally, Dr. Joanne Burke, PhD, RD, LD, Thomas W Haas Professor in Sustainable Food Systems, champions sustainable agriculture, food choices, nutrition, and economic and social wellbeing among UHN undergraduates and dietetic interns (11, 12). Similarly, the University of Vermont (UVM) has a multitude of majors and minors pursued by Dietetics students within the College of Agriculture and Life Sciences, such as Animal Science and Food Systems (13). The overarching theme of the UVM dietetic internship program is sustainable food systems, emphasizing ways in which registered dietitians can thread sustainability into aspects of nutritional care (13).

 In all aspects of the dietetics curriculum, there is a recognized focus on evidence-based practice, which means supporting recommendations and opinions with scientific evidence from peer-reviewed journals, such as the Journal of the Academy of Nutrition and Dietetics. Despite this focus, many of our own food habits are highly influenced by consumer trends, such as supporting local agriculture through citywide farmers markets, buying organically, or eating “clean” foods (14, 15). We are also influenced by extremes in the nutrition world, such as documentaries exploiting large industrial processing methods, the use of GMOs, and animal welfare. For many, these documentaries and other media methods have manipulated the way we eat, despite the science backing – or not backing – them.

 With regards to dairy, trends in nut milk consumption have increased substantially over the years, negatively correlating with cow’s milk consumption (1). Consumers may choose almond milk or soymilk rather than cow’s milk due to claims that the dairy industry contributes a large carbon footprint and that cow’s milk may be detrimental in the diet due to hormones, antibiotics, and other factors. Additionally, consumers may think that dairy alternatives are “clean” choices, still providing essential nutrients. However, it is questionable what is actually known about these non-dairy alternatives in addition to what is actually known about the dairy industry – one that is the primary local industry in greater New England (16).

 Each year, registered dietitians from the NEDFC are invited to speak to dietetic interns on class days in greater Boston. Class days, as defined by Massachusetts General Hospital’s dietetic internship program, “introduce interns to professionals in a variety of specializations that include community nutrition, clinical nutrition, nutrition support, sports nutrition, public health and policy” (17). In the past, planned talks have had a general focus, introducing interns to the mission of the NEDFC and the Fuel Up to Play 60 program in affiliation with the New England Patriots.

 This past November of 2014, Erin Wholey, a registered dietitian who serves as Manager of Nutrition Affairs at the NEDFC, spoke about sustainability efforts in the dairy industry to a group of dietetic interns at Mt. Auburn Hospital. Evaluations completed by dietetic interns following Erin’s presentation included both positive and negative feedback. Positive comments stated: *“Bonus was the session on the dairy industry’s influence on sustainability and environmentally friendly practices;” “Learned a lot about sustainability that I did not previously know;” “Brought new perspectives to dairy farming;”* and *“I was pleased with the perspective of the Dairy Council, as it lent a view to the world of food that I did not previously have.”* Alternatively, negative comments focused on the disconnect that was still felt: *“Loved lecture from farmer but it did not feel relevant”* and *“Did not feel like I came away with practical information, and do not think it will be useful in the future.”* (18)

 These key findings illustrate that there is indeed a knowledge deficit concerning what Boston dietetic interns understand about key agricultural sectors, such as dairy. Moreover, my own perceived knowledge deficits since beginning as an intern with NEDFC as well as testaments given by the NEDFC registered dietitians, Lisa Burnett, Erin Wholey, and Jill Read, bolster this notion. Lisa Burnett, Vice President of Nutrition and School Programs, states that the NEDFC is responsible for understanding what incoming populations of dietetic interns both *want* and *need* to know regarding evidence behind dairy (19). Thus, I decided to structure a focus group within a population of students at Simmons College. In particular, I planned to explore the topic of dairy with Nutrition & Dietetics students in their final semester of study, as many of these students will be the next generation of dietetic interns for the fall of 2015. The purpose of my focus group was to identify barriers to dairy consumption, knowledge gaps, and degree of interest in dietetics students in learning more about the dairy industry and related topics in order to provide sound recommendations for the NEDFC in planning future educational sessions with this population.

**LITERATURE REVIEW**

**Dairy and Non-Dairy Alternatives on Human Nutrition**

 Components of the Dairy Group, as defined by the USDA Food Patterns, include fluid milks, soymilk, cheeses, yogurt, and other foods that contain these dairy products (2). According to the 2010 Dietary Guidelines for Americans (DGA), 3 daily servings of low-fat or fat-free milk and milk products are recommended for Americans 9 years of age and older, 2.5 servings for children 4-8 years of age, and 2 servings for children 2-3 years of age (2). Despite this, intake of dairy products has consistently fallen below recommendations and shifted from low-fat or fat-free fluid milk and yogurt to cheese and other dairy products considerably higher in both energy and saturated fat (2).

 An 8-oz. glass of low-fat milk contains approximately 102 calories, 8 grams of protein, and 2.4 grams of fat, 1.5 grams of which is saturated (2). Additionally, a multitude of vitamins and minerals are provided, including calcium, vitamin D, vitamin A, vitamin B12, phosphorus, riboflavin, niacin, iron, magnesium, and potassium (2). According to the 2015 Dietary Guidelines Advisory Committee,

*“In the 2000 calorie pattern, the Dairy Group contributes only 12 percent of the calories, but almost 70 percent of the calcium and 65 percent of the vitamin D; 33-42 percent of the phosphorus, vitamin A, riboflavin, and vitamin B-12; and 21-29 percent of the protein, potassium, zinc, and choline.”* (1)

 It is further stated that calcium, vitamin D, and potassium are nutrients of concern in the public health sphere, due to the health risks that are posed when individuals are deficient. In particular, individuals deficient in calcium are at increased risk for osteoporosis, and low dairy intake is linked to chronic diseases such as cardiovascular disease, type 2 diabetes, and high blood pressure (1). For children, these nutrients are essential for growth and development, including formation of strong bones and teeth. Currently, insufficient evidence exists to suggest that dairy plays a role positively or negatively in weight management, though low-fat or fat-free dairy products do provide individuals with a substantial percentage of daily micronutrients for a small percentage of calories and fat.

 Individuals who choose not to consume dairy are advised to work with a registered dietitian to ensure calcium needs are met through alternative sources, including fortified foods. According to the 2015 Dietary Guidelines Advisory Committee,

*“Removing the Dairy Group would lower calcium levels by 68-88%, placing all age/gender groups well below recommended levels, bring vitamin A levels to 67% and 71% of recommended levels for older males and females respectively, lower vitamin D levels on all age/gender groups by 20-30%, lower potassium levels 15% across all age/gender groups, and lower magnesium to 69% of recommended levels for older men.” (1)*

Non-dairy alternatives, such as calcium-fortified almond milk, rice drink, and orange juice, as well as canned sardines with bones, provide equivalent amounts of calcium as is found in cow’s milk (1, 20). Additionally, almond milk, rice drink, hemp milk, and other nut milks are generally fortified with vitamin D3 and vitamin A palmitate, as is similarly done with cow’s milk (1, 20). However, it should be recognized that these alternative “milks” are devoid of adequate protein and important micronutrients, such as potassium and niacin (1, 20).

 Dark green vegetables (broccoli, kale, spinach, and collards) and fortified tofu may provide adequate calcium for few calories, though calcium varies considerably in tofu based on brand and production processes (1, 20). Other food items may contain minimal calcium levels and individuals can consume these foods in combination in order to enhance calcium intake. However, in order to achieve the same nutrient profile as cow’s milk, many alternatives will require an unrealistically large portion size with substantially more calories in comparison (1, 20).

 Calcium bioavailability is another notable aspect when considering non-dairy alternatives. The source of calcium found in cow’s milk is that which is most readily absorbed in the body due to the synergistic effects of vitamin D, lactose, and casein phosphopeptides (20). Substances in plant foods, such as oxalates and phytates in spinach, may inhibit absorption by binding calcium and forming insoluble salt complexes (20). For example, the bioavailability of calcium in spinach is 5 percent, versus 32 percent in fluid cow’s milk, meaning that eight cups of cooked spinach have to be eaten to absorb the same amount of calcium from one cup of milk (20). Also notably low is the bioavailability of calcium-fortified soymilk, which is between 20-25 percent depending on the producer (20).

**Part 1: Public Misconceptions**

 Due to the above scientific data to suggest the benefits of consuming a diet rich in low-fat and fat-free dairy, it may appear baffling as to why intake has decreased substantially over the years to a concerning level in the eyes of public health officials. Zaitlin et al. states that there are a number of misconceptions not just in the minds of the public, but also among health professionals, regarding many facets of dairy or dairy products, from healthfulness to production practices (21). She emphasizes that it is the responsibility of health professionals, particularly registered dietitians, to be able to separate myth from fact and thereby dispel public misconceptions through nutrition education and counseling (21). This applies to every line of work that a registered dietitian engages in, as it is an important aspect of maintaining *evidence-based practice*.

 Few studies have been conducted on college age populations regarding dairy intake, but those that do exist suggest a decline in consumption, both in males and females (5-7). Interestingly, a study out of Poland analyzing dietary calcium intake in nutrition and dietetics university students found that consistently low dairy/calcium intake existed, regardless of the knowledge base that these students have (8). Additionally, a study conducted in Japanese veterinary nursing students found that enhancing participation on a dairy farm led to more positive perceptions of dairy as a beneficial product for human health, as well as more respect for dairy farmers (9).

 ***Recombinant Bovine Growth Hormone*.** One mistaken belief is that “milk from cows treated with recombinant bovine growth hormone (rBGH) has higher levels of bovine GH (BGH) than milk from untreated cows” (21). In reality, there is no difference in BGH levels in milk from treated or untreated cows. Recombinant BGH began to be used by farmers in the 1990s in order to increase milk production (21). With this came ample scrutiny from the public, concerned about the safety milk and milk products with these added “hormones.” In actuality, evidence suggests that the rBGH protein is destroyed in the digestive tract upon consumption of milk and therefore has no hormonal activity in humans whatsoever (21). Furthermore, if rBGH were to survive through the gastrointestinal tract, human GH receptors cannot recognize the bovine form (21).

 These days, much of the public is still concerned about the use of rBGH in the dairy industry, which has led many producers to cease its use and include an rBGH-free label on products (21). Despite the fact that there is no evidence to suggest differences between milk products, many individuals are willing to pay more for those labeled as rBGH-free (21).

 ***Organic versus Conventional milk*.** Another mistaken belief is that organic milk is a healthier choice over conventional milk, primarily due to the fact that organic milk is marketed as antibiotic- and hormone-free. Additionally, many consumers feel that organic milk comes from cows that are treated more kindly and that a smaller carbon footprint is associated with production practices. The term “organic” refers to the farming system that is in place. In the case of organic dairy farming, specifications in the United States include the following:

* *All fertilizers and pesticides used on crops must be organic*
* *Access to pasture during the grazing season for at least 120 days out of the year, with 30% of total forage intake coming from pasture*
* *No use of antibiotics in treatment of illness* (22, 23)

According to an extensive review of the literature for factors influencing the composition of organic and conventionally produced milk, little conclusive evidence exists to conclude that there is a true difference (22). Researchers note that a multitude of factors influence milk composition, including diet, breed, genetic profile, season, stage of lactation, and size of the farm, rather than conventional or organic farming practices alone. (22)

 Antibiotic use tends to generate a preference among informed consumers for milk labeled as organic. What many consumers fail to recognize is that all milk sold for human consumption is antibiotic-free as per strict regulations set by both the FDA and individual state regulatory agencies (22, 23). When a cow becomes ill, it is immediately separated from the herd for treatment to prevent the spread of disease. On conventional dairy farms, ill cows may be treated with a course of antibiotics, whereas on organic dairy farms, organic-approved treatments are utilized (22, 23). If an ill cow on an organic dairy farm does not respond to treatment, the cow will be removed, either to produce milk on a conventional farm or be sacrificed for beef (22, 23). In either situation, all milk is closely monitored and tested for the presence of disease, antibiotics, or other chemicals at each stage of processing and transport before deemed safe for human consumption.

 Likewise, hormones – such as rBGH discussed above – have a tendency to generate a preference for milk labeled as organic. In reality, all milk, whether organic or conventionally produced, contains natural estrogen hormones due to the fact that it is produced by the mammary glands of another mammal (23). The level of estrogen is not dependent on conventional or organic practices, but rather on the stage of gestation of the cow (22). Also, as was stated above, some farmers may treat their cows with artificial hormones, like rBGH, though numerous studies have failed to find a negative impact on human health, as human GH receptors do not respond to the bovine form (21).

 ***The Carbon Footprint of Dairy.*** With growing concerns over global warming within the past several years, it is not surprising to see individuals attempting educate themselves on how to live “greener” on a daily basis. Studies suggest that some consumers may have shifted away from dairy and towards dairy alternatives due to the perception that the dairy industry contributes significantly to the carbon footprint. It has been estimated that only 2% of GHG emissions in the United States stem from the US dairy industry (16, 24). The Green House Gas Life Cycle Assessment (GHG LCA) for milk identified the major sources of emissions to include feed processing and preparation, enteric methane and manure emissions, transportation of raw milk from farms, processing plant emissions, and distribution to retailers (3, 16, 24). Interestingly, management practices on individual farms have a much greater effect on the carbon footprint than factors such as geography, size of the farm, or size of the processing plant (16, 24).

 Assessments like LCAs have been essential for generating an understanding of what areas within the dairy sector have the most prominent environmental impacts and where interventions should focus to reduce emissions (16). Since January 2009, the Innovation Center for US Dairy has been working towards a goal of reducing the carbon footprint of fluid milk by 25% by the year 2020 through such interventions (16, 24).

 In 2013, the Innovation Center for US Dairy released its 2013 US Dairy Sustainability Report, which comprehensively addresses the progress being made on the US Dairy Sustainability Commitment (16). One example of how dairy farmers are working to increase sustainability measures is through the issue of food waste in the US. Many are working in partnership with food companies to use food byproducts to supplement animal feed (16). A dairy cow has a remarkable ability to digest a number of plant materials in its four-compartment stomach that a human cannot, thereby efficiently converting human-inedible inputs into human-edible milk (25). However, in considering the biological processes within the cow, the concern of methane emissions is brought to light. Methane is a gas that is produced within the rumen of ruminants, like cows, when fibrous plant materials are fermented into digestible components (26). When released into the atmosphere, methane has 23 times the warming potential of carbon dioxide (26). The Dairy Power Project is effort by the Innovation Center for US Dairy to promote partnerships between farmers and food companies, combining food waste and cow manure in anaerobic digesters to produce renewable energy and nutrient-rich fertilizer as byproducts (16).

 ***Animal Welfare*.** Finally, concerns over animal welfare are certainly prominent as reasons for a lack of consumption of dairy. While justified concerns, it is important that consumers understand that there are guidelines in place to ensure humane practices. The National Dairy FARM (Farmers Assuring Responsible Management) Program is a voluntary animal care and quality program that was created by the National Milk Producers Foundation (16). Its purpose is to provide farmers with a plan of recognized best practices in dairy cow care to ensure safety, comfort, and enhanced productivity (16). Also included within this program is the implementation of annual dairy farm audits to evaluate the extent to which dairy cows are being properly cared for in all stages of life (16). In 2013, it was estimated that 70 percent of the US milk supply was from farms participating in the National Dairy FARM Program (16).

**Conclusion**

 Both the health benefits and efforts towards sustainability evidenced throughout the scientific literature to date provide significant support of recommendations for increased low-fat or fat-free dairy consumption among the US population. It is the responsibility of health professionals, particularly registered dietitians and nutritionists, to be well versed on updates to the scientific literature regarding dairy due to the fact that it is a widely recommended food product with essential nutrients of public health concern. Through use of this scientific evidence, registered dietitians and nutritionists will be able to make increasingly sound recommendations to clients, providing accurate fact to either discredit or support the variety of health trends advanced by social media.

**GOALS & OBJECTIVES**

 Based on both key informant interviews and the above literature, the overarching goal of my focus group was cultivated to identify knowledge gaps, interests, and opinions of Nutrition & Dietetics students – concerning topics advocated by the New England Dairy & Food Council – before anticipated entry into dietetic internship programs. In particular, objectives were as follows:

1. To generate fruitful discussion among 100% of participants, particularly with regard to the NEDFC, dairy products and health, the dairy industrial sector, and ongoing sustainability efforts.
2. To compile quantitative data and sound recommendations into a succinct document for the NEDFC in structuring appropriate “class days” for dietetic interns in the years to come.
3. To incite curiosity in focus group participants to broaden their knowledge beyond the classroom – perhaps to the local farms of New England – as evidenced by post-discussion evaluation tools (See Appendix 3).

**METHODS**

 A focus group was deemed the appropriate method for determining knowledge gaps among college students based on previous research assessing dairy intake in female college students (7). This focus group was notably different however, as the participants were enrolled in Nutrition & Dietetics coursework, therefore having previous knowledge of the role a variety of food groups play in health. Based on the assumption that these students have a general knowledge on the benefits and detriments of dairy from a human nutrition standpoint, less of a focus was placed on nutrition education. A greater focus was placed on barriers to consumption and other factors influencing individual intake patterns. Additionally, emphasis was placed on identifying knowledge gaps related to the meaning of sustainability within the dairy industry.

 Alongside the focus group, a survey was distributed with the intention of obtaining quantitative food frequency data. Previous research as shown that 7-day food records and food frequency questionnaires are a reliable way to assess dietary intake of a wide variety of dairy products, or particularly calcium intake (7,8). In a previous study assessing dairy consumption in adolescent females, a *mixed-methods approach* incorporated both a focus group and pre- and post-discussion survey measures (7). According to these researchers, “the mixed-methods integration occurs by connecting the analysis of results from the initial phase with the data collection from the second phase,” thereby providing further qualitative insight into initial quantitative findings (7).

 Before the survey and focus group commenced, participants were presented with a tote bag, courtesy of the NEDFC, filled with informational handouts as a “thank you” for participating. In addition, Chobani Champion’s Greek yogurt tubes and 1 percent Lactaid milk were available to try.

**Participant Recruitment**

 Participants were recruited through an informational e-mail (Appendix 1) sent through the Nutrition Department at Simmons College. The e-mail specified that students must be majoring in Nutrition & Dietetics, of senior status or enrolled in the DPD, in order to volunteer. Following recruitment, participants were sent a reminder via e-mail (See Appendix 1).

 Upon arrival for the scheduled focus group, participants were given a consent form (See Appendix 2) detailing the purpose, as well as privacy considerations with voice recording the session. Participants were asked to sign the consent form before the focus group commenced.

**Survey Study Design**

 The survey (See Appendix 3) was designed on paper, rather than electronically, so that participants in the focus group could complete both the pre- and post- sections (Part 1 and Part 2) on site. The purpose of the survey was to gain quantitative data on dairy consumption and incite meaningful thought in participants prior to the start of the focus group discussion.

 Components of Part 1 included a brief introduction, demographic questions, and a series of food frequency questionnaires that addressed dairy consumption in both “days per week” and “servings per day.” Additionally, key questions were included that prompted thought about possible barriers to consumption or reasons for personal choice. Participants were asked to not go on to Part 2 until the focus group discussion was complete.

 Part 2 consisted of two sections, the first of which was a chart of five questions to be answered, “strongly disagree” to “strongly agree,” based on personal opinion of the focus group. The second was a list of potential topics for dietetic intern education, particularly class day discussion topics. Participants were asked to place a check mark next to topics they would be interested in gaining more information on in the future.

**Focus Group Study Design**

 The objective of the focus group was to gain qualitative data on the barriers, knowledge gaps, and interests of knowledgeable students majoring in Nutrition & Dietetics at Simmons College – many of whom are also a year or less away from applying to a dietetic internship program. In designing the focus group, instruction was obtained via published works from the Centers for Disease Control (CDC) as well as additional credible resources (27-29). According to the CDC guidelines, questions should be short, pointed, focused on one dimension each, easily worded, open-ended, non-threatening, and non-embarrassing (27). Furthermore, according to guidelines published by Duke Social Science Research Institute (29), three types of questions should exist:

1. Engagement – Introduces participants to and makes them comfortable with the topic of discussion.
2. Exploration – Delves deep into the topic of discussion.
3. Exit – Assesses whether any pertinent issues were missed during the discussion.

The above categories shaped the question structure used within this focus group on dairy (See Appendix 3 for a full list of pre-planned questions).

**RESULTS**

**Sample Characteristics**

 Participants (n=8) were a mean age of 23 years (median age of 22 years), majoring in Nutrition & Dietetics at Simmons College in Boston, MA. One participant was a true undergraduate majoring *only* in Nutrition & Dietetics, while one was enrolled in the Didactic Program in Dietetics (DPD) and two were enrolled in the 4+1 program for an MS in Nutrition & Health Promotion. Additionally, three participants had a second major in such programs as Biochemistry, Public Health, or Exercise Science. With regards to personal diet choice, participants identified as “plant-based,” “lacto-ovo vegetarian,” “pescaterian,” “gluten-free,” or “none,” though most noted that these labels did not strictly define what they chose to eat on a weekly basis.

**Survey Part 1 Results**

 Due to the small sample size, survey data was not statistically analyzed. Rather, the following survey results reflect a close visual examination of the data obtained. Dividing the survey into two sections, “days per week” and “servings per day,” revealed interesting trends among participants.

 In assessing “days per week” with fluid “milk” items, only 4 participants consume LF (low-fat) or FF (fat-free) milk at least once during the week. Alternatively, the remaining 4 participants consume soymilk at least once during the week, with 2 consuming both soymilk and almond milk equally. Almond milk appeared most popular, with 5 participants consuming almond milk at least once per week. It is notable that the majority of participants, roughly 7 out of 8, indicate drinking a combination of “milks,” whether Soy + Almond, LF/FF + Almond, or Soy + LF/FF. For fluid “milk” items, the most common reason for a lack of consumption was concern about fat, followed by calories, taste, and animal welfare concerns.

 In assessing “days per week” with solid dairy items, the majority of participants, roughly 7 out of 8, indicate consuming plain and/or flavored Greek yogurt at least once during the week. Similarly, 6 participants consume full fat and/or LF/FF hard cheese, as well as frozen yogurt and/or ice cream, at least once during the week. Regular yogurt, either plain or flavored, was not popular among participants. For solid dairy items, the most common reason for a lack of consumption was, again, concern about fat, followed by calories, taste, and, this time, cholesterol. Animal welfare concerns were not as prevalent when considering solid dairy products as opposed to fluid.

 The two participants who self-identified as a form of vegetarian (vegetarian and pescaterian), and stated “vegetarian” as their reason for a lack of consumption of particular dairy products, consumed fluid “milk” as soy and almond varieties only, with one participant solely reliant on almond milk. Interestingly, both participants actually *did* indicate consuming a substantial amount of dairy products in the solid dairy item section. For example, survey data indicates both participants consume Greek yogurt at least 5x per week, with one also consuming cheese 5x per week and ice cream 1x per week. Therefore, although not consuming fluid cow’s milk, these participants self-identifying as vegetarian are readily consuming dairy in other forms.

 In assessing “servings per day,” data indicates the majority of participants, 6 out of 8, are meeting the DGA recommendation of 3+ servings of LF/FF dairy per day, with 2 participants achieving 6+ servings of dairy per day. Additionally, 6 out of 8 participants indicate consuming at least 1 serving per day of plain and/or flavored Greek yogurt, as well as full fat and/or LF/FF hard cheese. Interestingly, the remaining 2 participants who did not meet the DGA recommendations were not those who self-identified as vegetarian. Rather, these participants self-identified as following either a plant-based diet or a gluten-free diet, and yet did not achieve 3 servings of dairy per day. In general, with regard to fluid “milk” intake, almond milk consumption appeared most prevalent, with 4 participants consuming at least 1 serving per day, while 3 consumed LF/FF milk and 2 consumed soy milk.

**Focus Group Findings**

 The results of the focus group are consistent with survey results and act to further enhance understanding of why these participants – college students studying Nutrition & Dietetics – feel and/or act towards dairy the way they do. Particularly notable focus group comments are divided by topic in Table 1 (See Appendix 4).

 ***Dairy and Health.*** Participants did not appear confident in responding to questions about what they already knew regarding dairy and human health. Micronutrients like calcium and vitamin D were brought up in relation to bone health, but few other macro- or micronutrients. When participants were asked why they believe the DGAC for 2015 is still recommending 3+ servings of low-fat or fat-free dairy per day for Americans over 2 years of age, one participant asked if Americans are currently meeting the recommendations. This same participant suggested that if this were the case, the new 2015 DGA would likely include these same recommendations again due to unmet recommendations for dairy by the majority of Americans.

 ***Dairy and Sustainability*.** When asked if participants considered dairy to be sustainable, all voiced a resounding “no.” Reasons were primarily related to fear of antibiotics and hormones, animal welfare concerns on factory farms, and greenhouse gas emissions.

 ***Sustainability.*** When asked to define sustainability, participants were eager to share both their own definition and what they were currently practicing. An agreed upon definition of sustainability included aspects of conserving water and land, recycling, purchasing locally, and overall use of resources sparingly now to benefit generations to follow – though no connection to human health was made. Sustainability was seen is a very important issue among participants, but they also agreed that cost was a major barrier to following sustainable practices.

 When asked about seasonal eating, participants noted appreciating the idea and attempting it in daily life. However, many also said they would choose items like strawberries or bananas if available, regardless of the season and often if financially attractive. Living in a dorm room at a college/university and using the on-campus dining halls and cafes was a factor noted for not allowing students to know where their food comes from and make sustainable choices.

 A major barrier to following sustainable practices, aside from cost, was peer pressure. Some participants noted that restricting themselves to sustainable practices affected their actions at social events in a noticeable way. Due to the social stigma, many find they conform to normal practices quickly under the pressure of others. Quite notable was one participant’s experience of being looked at as suffering from anorexia nervosa because she limited herself to what she knew was sustainable in the dining hall.

 ***Personal Consumption of Dairy*.** When asked how important dairy is in their diet, answers were mixed. About half of participants felt dairy was low on their list of priorities, while the other half was quite cognizant of their daily dairy intake. The primary form of dairy that was consumed daily was not fluid milk, but rather Greek yogurt. Participants cared far more about gaining protein from dairy rather than calcium, claiming that they consume adequate calcium daily through green leafy vegetables and fortified foods. Interestingly, although sustainability was on the minds of many participants when speaking about reasons for a lack of consumption of fluid cow’s milk, attitudes towards cow’s milk-containing products like Greek yogurt, cheese, and ice cream/frozen yogurt were not perceived in the same negative manner.

 Another reason for low consumption of dairy was perceived lactose intolerance. Some claimed that dairy was a large part of their childhood, when consuming multiple glasses per day was commonplace, but now a single glass causes gastrointestinal distress. Most were unaware of the spectrum of lactose intolerance, or lactose sensitivity, and had entirely cut fluid cow’s milk from their diet to alleviate distressing symptoms. One participant, who had conversed with me a week prior, noted trying to test her tolerance and found she was able to handle significantly more dairy than previously thought. This point of conversation sparked a great deal of interest in the room to experiment with individual tolerance levels.

 ***Personal Consumption of Dairy Alternatives*.** Primary reasons for a lack of consumption of fluid cow’s milk, shown as well in the survey results, were calories, fat, and taste. Surprisingly, participants turned only towards soy and almond milks, and not towards other dairy alternatives trending these days, such as cashew, hemp, rice, and coconut milks. Most participants were aware of the low protein content of almond milk, but chose to drink it due to a desire for a more palatable taste and thickness when added to smoothies or cereals. One participant stated drinking soymilk more often than almond milk because of the amount of water wasted in the processing of almonds.

 ***Recommendations to Clients*.** Despite negativity towards some dairy products, and the dairy industry in general, all participants noted that they would recommend dairy per the DGA recommendations to their clients one day. There was consensus around the idea of not letting one’s own personal preferences get in the way of giving professional, science-based advice.

 Interestingly, most participants said that they do not “practice what they preach,” and are “trying to work on that.” For example, one participant noted telling her younger brother and mother to increase their milk intake to maintain strong bones, and even to use chocolate milk as a post-workout beverage as a great mix between carbohydrates and protein. However, the participant would not follow this advice herself, despite being an active long-distance runner.

 As was expected with a group of students studying Nutrition & Dietetics, skepticism over recent research was a large barrier to personal consumption and thoughts surrounding how to provide recommendations. Recent research interests included dairy and CVD, issues of dairy pulling calcium from bones, hormones in dairy causing early puberty in children and adolescents, as well as other topics.

**Survey Part 2 Results**

 The survey data collected in Part 2 is some that will be most useful to the NEDFC in structuring presentations to young professionals, like dietetic interns, in the future. Out of eight topics of interest participants desired to learn more about, the following received most attention:

* Sustainability practices on local dairy farms
* How to purchase directly from farms to ensure they benefit
* How to make recommendations as a practitioner
* Hormones and antibiotics

In addition, over 50% of participants indicated that they learned things about dairy they previously did not know, that their opinion about various aspects of dairy has changed, and that they plan to consciously increase their intake of low-fat and/or fat-free dairy products.

**DISCUSSION**

 Sustainability was a key emotional topic of conversation, with the majority of participants wishing they could live in a more sustainable way due to what they know and fear about global warming in this day and age. When considering dairy specifically, there was a general consensus that the dairy industry is a main provoker of global warming due to greenhouse gas emissions, water waste, and other production processes.

 Throughout the focus group, there was a noticeable disconnect between what participants considered dairy to be defined as. Participants did not choose to consume fluid cow’s milk for the aforementioned sustainability reasons, but still consume other sources of dairy on a daily basis, whether Greek yogurt, regular yogurt, cheese, ice cream, or frozen yogurt. Furthermore, a fear over hormones and antibiotic use existed with regards to fluid cow’s milk, but not with these other sources of dairy.

 When given a small amount of knowledge about the sustainability efforts in the dairy industry on local farms, participants were surprised and eager to learn more. This was also the case when given a small amount of knowledge about lactose intolerance, the nutrient package of dairy, and the differences between dairy and alternative fluid “milks” (i.e. ingredients, cost, nutrient profile). This shows that although students have a set of opinions shaping their current practices, they are open to learn and truly understand the facts.

 When asked how they would provide recommendations to clients one day, all participants mentioned how important it is to give individualized advice to a client that is evidence-based. Currently, with ample conflicting research on the role of dairy in human health, including its relation to chronic disease, participants felt confused as to what to believe.

 In its entirety, the goals of my focus group were met, including the generation of fruitful discussion among 100% of participants, the compilation of quantitative and qualitative findings for the NEDFC registered dietitians, and finally the incitement of curiosity in participants to expand their knowledge of these topics. Meeting of the latter objective was demonstrated through survey part 2 results, indicating that all participants showed interest in learning more about one or more topics within their dietetic internship curriculum.

**Limitations**

A notable limitation was the group of participants, most of who were close acquaintances and volunteered for that reason. This could have sparked bias among opinions about the focus group. Additionally, as the moderator, I would have benefitted from a greater knowledge base on the topic at hand – aspects of the dairy industry. Although a focus group is not an educational session, many questions came up that I wish I had been able to address more fully, though could not as a short-term intern with the New England Dairy & Food Council. Finally, it would have been beneficial to conduct two or more focus groups, rather than one, in order to assess differences between groups and see if trends in knowledge, beliefs, and practices were consistent.

**Strengths**

With eight participants, the size of the focus group was favorable, as it has been found that focus groups between 6-10 participants have the greatest potential to develop meaningful discussion among all members (29). This was the case, with 100% of members contributing fairly equally to the discussion and feeling comfortable doing so. Additionally, the structured set of questions formulated in advance created a framework from which discussion could flow – and was especially useful in the beginning when participants were more hesitant to contribute.

**CONCLUSION**

 As the literature boasts and my findings within the population of Nutrition & Dietetics students at Simmons College support, even students in the health fields may not be meeting the DGA 2010 recommendations for 3+ servings of low fat or fat free dairy per day (8,9). The beliefs and barriers to consumption surrounding this finding are important for assessing where future education of health professionals should focus, as adequate dairy intake has implications for numerous health conditions – notably osteoporotic risk from low calcium and vitamin D intake. Additionally, beliefs about the dairy industry at large need to be satisfied with the truth regarding dairy farm practices and ongoing changes in sustainability actions. Through enhanced education, young health professionals, particularly registered dietitians, will be able to respond to client needs with evidence-based practice on a wide variety of trending topics, linking sustainability, nutrition, and health. It is a hope that these results will guide planning by the registered dietitians within the New England Dairy & Food Council for dietetic internship class days in the years to come, in order to nurture an ongoing and necessary conversation.

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**Appendix 1: Email Correspondence**

**Initial Recruitment Email**

Dear nutrition students,

 I am a senior nutrition and dietetics student enrolled this semester in Advanced Community Nutrition, taught by Dr. Lisa Brown. As part of my semester-long project, I am hosting a focus group to gain pertinent insight from students on key nutrition and sustainability topics, and am looking for interested participants. To be eligible, you must be a senior or a DPD student enrolled in the nutrition program here at Simmons. The focus group will be held on Monday, April 6th from 11:30am-12:15pm on Simmons College campus.

 If interested and available to make the above date and time, please email me at suarezj@simmons.edu by Wednesday, April 1st to secure your spot. Your participation would greatly assist my community fieldwork placement, the New England Dairy & Food Council (NEDFC), in planning future educational opportunities for students and dietetic interns alike. Furthermore, you will receive a small gift as well as refreshments as a thank you for your participation. Thank you for your time!

Best,

Jacqueline Suarez

**Reminder Email**

Dear Simmons Student Volunteers,

 Thank you for your willingness to participate in my focus group for the **New England Food & Dairy Council (NEDFC)**. As discussed in the previous e-mail, my goal is to gather ideas and opinions surrounding the dairy industry and dairy consumption in the community - especially with recommendations likely to remain unchanged regarding dairy in the new 2015 DGA.

  You will be in a group with 5-10 other Simmons College nutrition students, either seniors or DPD. All opinions and thoughts vocalized during the focus group will be kept anonymous when data is brought back to the registered dietitians at the NEDFC. Upon arriving, you will be asked to sign a waver allowing the focus group to be voice recorded, the purpose of which is to prevent missing relevant key points of conversation when condensing findings.

  Please see below for the date, time, and place. If you will not be able to attend as planned on the day of, please call me, Jacqueline, at 518-428-7977. Please arrive on time, to allow time for refreshments and an initial survey, as the focus group will begin promptly. You will be compensated with a small gift as a thank you following our session.

**Date: Monday, April 6th**

**Time: 11:15am-12:15pm**

**Location: L-428**

(Lefavour Library Building; Take elevator or stairs to the fourth floor from the main lobby, turn right, proceed straight down the hallway to L-428)

Best,

Jacqueline Suarez

**Appendix 2: Consent Form**

**Consent to Participate**

 You have been asked to participate in a focus group sponsored by the New England Dairy & Food Council of Massachusetts. A focus group is defined as a structured discussion between 5-10 individuals, led by a skilled moderator, with the goal of fostering free-flowing conversation about a targeted topic. A focus group is NOT a debate, group therapy, a conflict resolution session, an opportunity to collaborate and problem solve, a promotional opportunity, or an educational session.

 The purpose of this group today is to understand some of the knowledge gaps that exist between students studying nutrition & dietetics and all aspects of the dairy industry, from human health to sustainability to animal health. The registered dietitians who run the New England Dairy & Food Council will use the information learned today in planning future class days for Boston-area dietetic interns.

 You may choose to stop participating at any time, without consequence. Although voice recorded, your responses will remain anonymous and no names will be mentioned in any steps of reporting.

 Please keep in mind that your thoughts and opinions today matter, and there are no wrong answers to the questions to follow. Your honesty is much appreciated as it will lend to a greater understanding by NEDFC on how to structure future educational programming towards professionals. We ask that all participants show respect for others opinions and recognize, for the sake of privacy, that all responses should not leave the focus group session.

“I understand the above information and agree to participate fully under these conditions.”

Name (printed): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_, 2015

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Appendix 3: Focus Group Materials**

**Questionnaire**

*Dear students,*

*Thank you for volunteering to participate in this focus group on dairy today. Your responses throughout the session and within this survey will remain anonymous, only used to assist in planning future endeavors of the New England Dairy and Food Council.*

*At any time throughout the focus group if you feel discomfort, you will not be penalized from excusing yourself as an active participant.*

*Please read all instructions carefully and complete the following food frequency questionnaire to the best of your ability.*

*------------------------------------------------------------------------------------------------------------------------------------*

Please indicate how many **days** during a typical **week** you consume the following item(s):

(0 – 7; 0 = none, 7 = 7 days per week)

\_\_\_\_Whole milk

\_\_\_\_Reduced fat milk (2%)

\_\_\_\_Low-fat milk (1%)

\_\_\_\_Fat-free milk (skim)

\_\_\_\_Low-fat chocolate milk (1%)

\_\_\_\_Lactaid/lactose-free milk

\_\_\_\_Soymilk

\_\_\_\_Almond milk

\_\_\_\_Cashew milk

\_\_\_\_Hemp milk

\_\_\_\_Coconut milk

\_\_\_\_Flax milk

\_\_\_\_Rice milk

\_\_\_\_FairLife milk

If you responded 0 -1 for any of the above items, please indicate all reasons that apply:

\_\_\_\_Taste

\_\_\_\_Cost

\_\_\_\_Lack of availability

\_\_\_\_Calories

\_\_\_\_Fat

\_\_\_\_Cholesterol

\_\_\_\_Lactose Intolerance

\_\_\_\_Vegan

\_\_\_\_Vegetarian

\_\_\_\_Environmentalism (ie. Concerned about the carbon footprint)

\_\_\_\_Animal Welfare

Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Please indicate how many **days** during a typical **week** you consume the following item(s):

(0 – 7; 0 = none, 7 = 7 days per week)

\_\_\_\_Whole milk yogurt, plain

\_\_\_\_Whole milk yogurt, flavored

\_\_\_\_Low-fat/non-fat yogurt, plain

\_\_\_\_Low-fat/non-fat yogurt, flavored

\_\_\_\_Greek yogurt, plain

\_\_\_\_Greek yogurt, flavored

\_\_\_\_Soy yogurt

\_\_\_\_Almond milk yogurt

\_\_\_\_Full-fat hard cheese (swiss, provolone, cheddar, parmesan)

\_\_\_\_Low-fat/fat-free hard cheese

\_\_\_\_Full-fat soft cheese (cottage cheese, ricotta, cream cheese)

\_\_\_\_Low-fat/fat-free soft cheese

\_\_\_\_Processed cheese product (American, Velveeta, packaged macaroni and cheese powder)

\_\_\_\_Ice cream

\_\_\_\_Frozen yogurt

If you responded 0 -1 for any of the above items, please indicate all reasons that apply:

\_\_\_\_Taste

\_\_\_\_Cost

\_\_\_\_Lack of availability

\_\_\_\_Calories

\_\_\_\_Fat

\_\_\_\_Cholesterol

\_\_\_\_Lactose Intolerance

\_\_\_\_Vegan

\_\_\_\_Vegetarian

\_\_\_\_Environmentalism (ie. Concerned about the carbon footprint)

\_\_\_\_Animal Welfare

Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Please indicate how many **servings** you consume during a typical **day** of the following item(s):

(0 – 5+; 0 = none, 5+ = 5 or more servings per day)

\_\_\_\_Whole milk

\_\_\_\_Reduced fat milk (2%)

\_\_\_\_Low-fat milk (1%)

\_\_\_\_Fat-free milk (skim)

\_\_\_\_Low-fat chocolate milk (1%)

\_\_\_\_Lactaid/lactose-free milk

\_\_\_\_Soymilk

\_\_\_\_Almond milk

\_\_\_\_Cashew milk

\_\_\_\_Hemp milk

\_\_\_\_Coconut milk

\_\_\_\_Flax milk

\_\_\_\_Rice milk

\_\_\_\_FairLife milk

\_\_\_\_Whole milk yogurt, plain

\_\_\_\_Whole milk yogurt, flavored

\_\_\_\_Low-fat/non-fat yogurt, plain

\_\_\_\_Low-fat/non-fat yogurt, flavored

\_\_\_\_Greek yogurt, plain

\_\_\_\_Greek yogurt, flavored

\_\_\_\_Soy yogurt

\_\_\_\_Almond milk yogurt

\_\_\_\_Full-fat hard cheese (swiss, provolone, cheddar, parmesan)

\_\_\_\_Low-fat/fat-free hard cheese

\_\_\_\_Full-fat soft cheese (cottage cheese, ricotta, cream cheese)

\_\_\_\_Low-fat/fat-free soft cheese

\_\_\_\_Processed cheese product (American, Velveeta, packaged macaroni and cheese powder)

\_\_\_\_Ice cream

\_\_\_\_Frozen yogurt

***PLEASE STOP HERE AND WAIT FOR THE MEDIATOR TO START THE FOCUS GROUP***

*Again, thank you for your participation. I hope you have had an enjoyable experience. Please provide your honest feedback to the following questions below based on today’s focus group.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly agree | Agree | Neither | Disagree | Strongly disagree |
| The mediator created a comfortable climate for conversing |  |  |  |  |  |
| I learned things about dairy that I previously did not know |  |  |  |  |  |
| My opinion about any aspect of dairy (health, production, sustainability, etc) has changed after participating in this focus group |  |  |  |  |  |
| I plan to increase my consumption of low-fat and/or fat-free dairy products |  |  |  |  |  |
| I believe this topic is relevant to the dietetics profession |  |  |  |  |  |
| Dietetics curricula should incorporate a greater focus on sustainability |  |  |  |  |  |
| I enjoyed today’s focus group  |  |  |  |  |  |

*Hypothetically, if visited by the New England Dairy and Food Council during your time as a dietetic intern, what would you like to gain more information on?*

\_\_\_\_Sustainability practices on local dairy farms

\_\_\_\_How to purchase directly from farms to ensure they benefit

\_\_\_\_Health benefits of dairy

\_\_\_\_Hormones and antibiotics

\_\_\_\_Lactose intolerance and sensitivity

\_\_\_\_Fuel Up to Play 60 Campaign

\_\_\_\_Day in the life of a dairy farmer

Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Additional Comments:*

**Focus Group Structured Questions**

|  |  |
| --- | --- |
| Type of Question | Questions Used |
| Engagement | * What do you perceive to be the health benefits of dairy?
* The DGA 2010 – and still held true by the DGAC 2015 – recommends 3+ servings of low-fat or fat-free dairy products per day (including milk, cheese, yogurt, and soy milk). From what you know regarding human nutrition, why do you think this recommendation has remained strong?
* How would you define sustainability?
* How important is it that you know where your food comes from?
* Do you incorporate sustainable nutrition and lifestyle habits into your own daily routine? If so, how?
* What do you think of the idea of “eating seasonally?”
 |
| Exploration | * From what you know about dairy and health, would you also consider dairy to be a sustainable food?
* If I said that milk was the freshest crop you could buy in Massachusetts, what would you think?
* When you think of the dairy industry, what words or images come to mind?
* Do you wish you knew more about the dairy industry?
* How crucial do you feel dairy is in your diet?
* Do you feel you consume adequate or inadequate dairy? If inadequate, what barriers prevent this?
* Do you know the difference between lactose free and normal milk?
* Do you know the difference between organic and conventional milk?
* Consumption of nut milks is no the rise – do you consume these more than cow’s milk? Why or why not?
* Consumption of Greek yogurt is on the rise – why is this increasing while fluid milk is decreasing?
* Would you recommend dairy to your clients one day? Why? What pro or cons do you know of?
 |
| Exit | * Have you ever been to a dairy farm? Would you like to?
* How important is it to you that your dietetic internship program has components focused on learning about local farms, farmers, industry, and crops in the area?
* Are there any last thoughts about dairy that you’d like to add?
 |

**Appendix 4: Focus Group Results**

|  |  |
| --- | --- |
|  | **TABLE 1: Key Focus Group Comments** |
| Dairy and Health | * I think of calcium, vitamin D…
* Bone health
* I think of formula for babies – like whole milk
 |
| Dairy and Sustainability | * Honestly, I don’t think dairy is sustainable. I think the majority of our dairy comes from the seven major factory farms. Images of cows chained their whole lives and kept artificially impregnated to produce milk are things that come to mind…
* I worry about antibiotics and what is in the cows’ feed that can get into our milk
* Antibiotic resistance is definitely a thing to worry about
* Even on organic farms, when cows develop mastitis, they need treatment with antibiotics
* I guess I believe dairy is the freshest crop, but that doesn’t change practices
* How is 75% of a cow’s diet *not* digestible by humans? I don’t get it…
 |
| Sustainability | * Pretty important to follow sustainable practices
* The only thing that limits it for me is cost, but I do the best I can
* I think we all preach how important sustainability is, but we don’t really practice it
* It is extremely difficult to find out where your food is coming from
* I end up severely restricting myself when I try to eat sustainably on campus
* Peer pressure is a major barrier; every time I am at a restaurant, I am given a lot of “sass” if I appear picky, so I just give in and eat anything
 |
| Personal Consumption:Dairy | * Honestly, dairy is a pretty low priority on my list
* I don’t drink milk, but I’m a huge yogurt eater
* I do yogurt for the protein, but not really for the calcium
* Calcium is definitely on my mind, ensuring my bones are healthy
* I always think about getting enough calcium; it is ingrained in me to worry about my bones
* As I’ve gotten older, my stomach cannot handle a glass of milk so I stay away completely
* I tried to find my lactose “threshold” and realized I can handle some milk – I’m a lot more tolerant than anticipated!
 |
| Personal consumption:Dairy Alternatives | * Unsweetened soymilk is pretty cheap and less calories than cow’s milk
* I have heard almond and cashew milk are pretty wasteful in processing
* Do you know anything about current trends in dairy alternatives? Even Lactaid?
* I usually tend to go towards almond and soy for the flavor
* Its so surprising how little protein there is in almond milk!
* I think protein is an aspect we need to promote in conversation to get people to drink more milk. In my clinical placement, clients are saying how healthy they are turning to almond mil, but these are hospital patients at Joslins who NEED the protein!
* I drank milk every day in childhood, then switched to soy for fear of hormones, and then switched to almond for a lower calorie option. I know there is no protein, but I also know I get adequate protein from other sources
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| Recommendations to clients | * I think dairy makes a lot of sense for a lot of people, so it would be wrong to let my personal preferences guide my clients
* My skepticism in recommending dairy comes from research that is constantly conflicting concerning antibiotics and hormones, and the news that says girls are hitting puberty sooner… It is just so complicated.
* What do you think about the studies saying dairy can leach calcium from bones when it turns acidic in the body?
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