

Green College Nutritional Assessment - Land Food Community III: Food System Sustainability

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Green College Nutritional Assessment

Land Food Community III: Food System Sustainability



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Executive Summary

Green College (GC) is a graduate residence at the University of British Columbia in Vancouver, BC. The Residence currently houses 96 residents, supplying them with 10 meals a week (five breakfasts and five dinners) through a mandatory meal plan. The purpose of the GC meal plan is to provide residents with food, a sense of community, and a means to share ideas. Residents have the option to choose from three meal plan types: vegetarian, omnivore and meat.

A survey is issued to the residents at the end of every week, which allows residents to provide feedback to the kitchen. Through the survey many residents have expressed concerns regarding the nutritional value of the meals. Green College approached us (LFS450) to conduct a nutritional assessment of the GC meal plan to determine: what are the nutritional concerns of Green College residents regarding the meal plan? And what does a nutritional assessment of the menu reveal about the meal plan?

We conducted a literature review and a number of interviews with the residents, the chefs at Green College, and the head chef at Vanier Place, to gain an understanding and define the context, problems and objectives of our project. Once the problem had been defined a survey was issued to the residents. The survey had a response rate of 75% and was used to assess the residents' nutritional perception of the food, their concerns, their understanding of nutrition, and the general opinions regarding possible solutions.

A nutritional analysis was also conducted for four recipes - two vegetarian dinners and two meat dinners - provided by the chefs. We used an online software called eaTracker®, and the recipes were analyzed for fat, iron, sodium and caloric content.

From the informational interviews it became apparent that there were a number of barriers preventing change from being implemented. Cost was a significant barrier for the chefs, as well as a lack of nutritional knowledge. It was also found that the GC chefs were hesitant to implement changes based on the weekly surveys as they did not feel that it was representative of the entire residence. Discussing this with the dining society we found that residents response rates were low. From the survey it was determined that 30% of residents respond the majority of the time (3-4 times/month), 47% respond less than half of the time, while 22% of respondents said they never completed the survey. Motivation for completing the survey was generally to

inform the kitchen of likes, dislikes, to make requests or as a personal obligation. Those who reported to respond rarely or never stated that there was either no motivation to do so or they were discouraged as they felt that the feedback was not being implemented or acknowledged.

As for nutritional concerns, we found that residents were most concerned with excess fat in the meals (44%), excess sodium (36%), excess sugar (32%), inadequate iron(19%), and excess dairy (13%), while 31% of respondents had no nutritional concerns. Perception of portion size was also examined among the residents and it was determined that the majority did not want to consume all that was provided in one sitting. 36% stated that portions were generally too large but leftovers are appreciated 33% reported that they were just right, and 28% said too large and 3% said that portions were too small. Salad bowl size was generally considered adequate (71%), 17% reported that it was too small. It was also determined that residents had a preference for home-style meals over restaurant-style meals (59%), with 28% reporting that they would like to see a mix of the two.

Through the nutritional analysis we determined that iron content was within the recommended ranges for both sexes, sodium was over the 2300 mg UL in half of the recipes analyzed, fat content was within the DRI for both sexes, with the exception of the first vegetarian meal for females.

Based on the results we determined that there were a number of different leverage points for change. Weekly surveys are an important tool for GC, however, the chefs are not able to communicate back to the residents when considerations were made, and as a result residents are reluctant to provide feedback, we recommend implementing a means for the kitchen to communicate with the residents that can illustrate which changes are the outcome of the survey results.

Other recommendations for the staff include sauce on the side to allow residents to control their fat and salt intake, a standard serving scoop to meet Canada food guide serving sizes, with half portions available. We recommend meals with fewer ingredients to achieve residents taste preference, nutritional needs and reduce costs. Substitutions that may be implemented include vegetable oil rather than animal fat, low fat dairy, and low sodium options. Another option would be to eliminate or reduce salt in the recipes and provide GC residents with saltshakers.

For the residents we recommend implementing the Canada Food Guide poster in the resident hall for the residents' reference when making food choices. We also recommend residents to remain mindful about portion size and food choices. For those who are concerned about iron intake, we recommend consuming foods that are high in Vitamin C, avoiding spinach and dairy along-side high iron foods, and consuming more lentils, soybeans or red meat. Future project possibilities include collaboration with the UBC dietetics program.

Abstract

A nutritional assessment was conducted for the meal plan at Green College in UBC. Green College is residents which houses and provides meals for 96 graduate students across a variety of academic fields. We conducted a number of interviews with residents and chefs to gain insight into the types of nutritional concerns and the barriers that prevent change; a survey to measure the nutritional perceptions of residents; and a nutritional analysis of four meals to determine the fat, sodium, iron and caloric content of the meals. The survey response rate was 75%. The major concern among residents was excess fat (44%), sodium (36%) and sugar (32%) in the meals. Minor concerns included inadequate iron (19%) and excess dairy (13%). Portion sizes were reported to be too large; with only 36% of respondents stating that portion size was just right or too small. The nutritional analysis revealed that for the four meals analyzed iron content was within the recommended ranges for both sexes, sodium was over the 2300 mg UL in half of the recipes, and fat content was within the DRI for both sexes, with the exception of the first vegetarian meal for females. Residents' perception of the meals reflected both the nutritional content of the meals and common Canadian perceptions and concerns of nutrition.

Low survey response rates were determined to be a major barrier for implementing change in the recipes. 22% of respondents reported that they never complete the survey, while only 30% of respondents reported completing the survey on a regular basis (3-4 times a month). Motivation to complete the survey included informing the kitchen of likes and dislikes, making requests and a feeling of personal responsibility. Those who reported to respond rarely or never stated that there was either no motivation or they were discouraged as they felt that the feedback was not being implemented or acknowledged.

A number of leverage points for change were identified. We have indicated that communication between residents and chefs is key, weekly surveys should be accompanied by some sort of follow up from the chefs to acknowledge concerns. This may include providing residents with written or verbal notification of the concerns that they have addressed. For GC staff we recommended sauce on the side, offering a half portion option, a standardized serving scoop, low fat and low sodium substitutions when possible and simpler meals. For the residents we recommended implementing a Canadian food guide poster in the dining hall for their reference. We also recommend that residents be aware and mindful of portion size and their own nutritional needs. An informational poster was provided to the residents so that they could improve their food choices, highlighting ways to increase iron absorption and limit caloric intake. Future project possibilities include collaboration with the UBC dietetics program.

Introduction

Green College (GC) is a residential establishment, located on the Northwest side of the University of British Columbia campus, located in Vancouver, British Columbia, Canada. The residence provides housing to roughly 100 graduate students, postdoctoral fellows, and visiting faculty (Green College, UBC, 2009). While living at GC, meals are provided to the graduate students in the GC dining hall, which is coordinated by The Green College Dining Society (GCDS), a non-profit organization. Meals are provided based on the meal plans that residents have signed up and paid for in advance. The three meal plan options include meat, vegetarian (all meatless meals, but not vegan), and omnivore (alternating meals between the meat meals and vegetarian meals). Five breakfasts and five dinners are served each week during fixed times: 0730 to 0930 Monday to Friday for breakfast, and 1815 to 1930 Sunday to Thursday for dinner. Scholarly discussions over shared meals are encouraged by this dining schedule. The meal plan is mandatory and is an integral part of life and community participation at Green College (Green College, UBC, 2009). However, meals are also able to be taken “to-go” if the kitchen staff is notified in advance.

A weekly meal survey is currently being circulated on Friday of each week, as an opportunity for residents to give feedback on the meals they consumed over the course of that week. The results of this survey are provided to the GCDS and to the chefs at Green College. The main problem, however, are the nutritional concerns expressed by current residents of Green College, regarding the GC meal plan. It is never easy, or even feasible, to design a meal plan that is accepted by such a large group of residents. This project has attempted to elucidate the problems faced by chefs in formulating accepted meal plans that addresses the concerns of all

stakeholders, the major nutritional concerns of residents, as well as the true nutrient content of the food being served.

According to the North American food system, living a healthy lifestyle means consuming a diet that has balanced fat, salt, and iron content (Clare and Thomas, 2007). Serving all GC residents the exact same meals is convenient but not ideal, as both the North American food system and the global food system have demonstrated that the caloric intake required by both genders is different (Clare and Thomas, 2007). Our group's value assumption is based on the notion that meals should be planned in a balanced manner; our group's value assumption likely influenced the nutritional assessment of meals at GC.

Research Questions

1. What are the nutritional concerns of Green College residents regarding the meal plan?
2. What does a nutritional assessment of the menu reveal about the meal plan?

Green College Food System Schematic

This diagram illustrates the flow of information and money, which are two determining factors for the nutritional content of the meals at Green College. As illustrated, Green College has an open approach to the meal plan: the weekly surveys allow the residents to provide feedback and have their opinion influence the meal content.

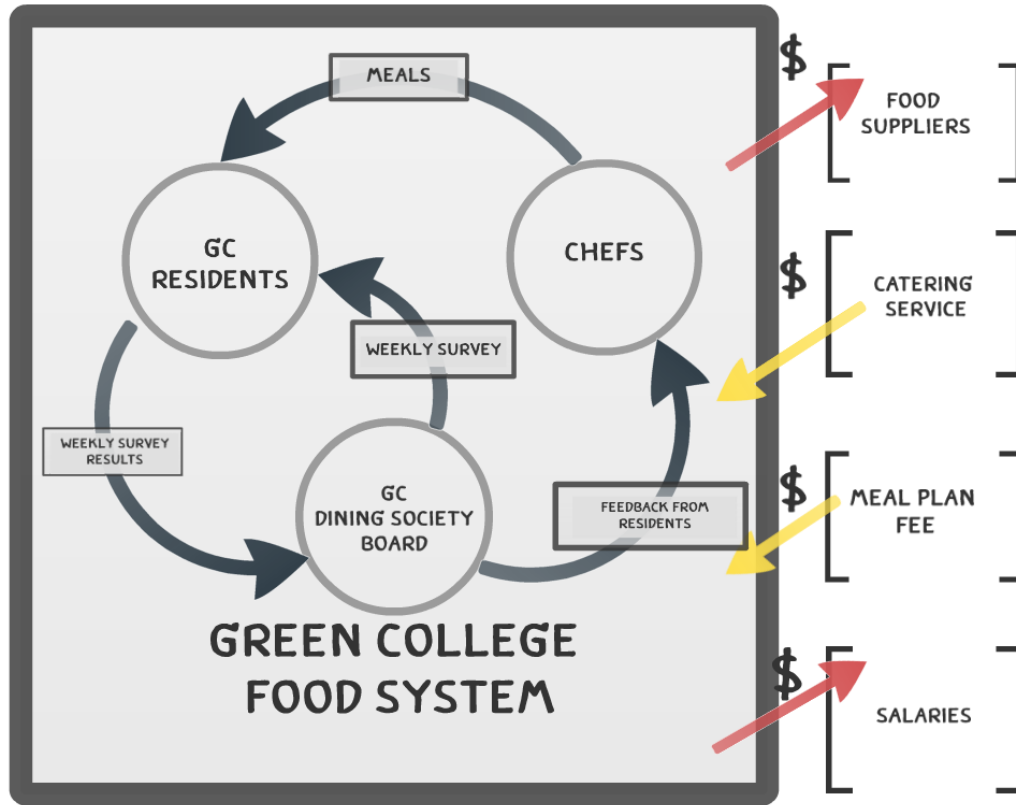


Figure #1: Green College Food System Web

Methodology

A. Key Informant Interviews

To support the preparation of the project proposal, informal key informant interviews were employed to better understand and define the objectives of this project. Key informant interviews are described as “qualitative in-depth interviews with people who know what is going on in the community” (UCLA CHPR, 2012). They are used to gather information from a broad range of perspectives that help to illustrate and define problems and often recommend solutions. In the context of this project, interviews with key informants were used to gain a better and more holistic understanding of the community and the problem that we were working with, as well as

to elucidate possible solutions or leverage points. Key informant diversity is very important, which is why our research team met with and interviewed a variety of stakeholders from Green College, as well as Steve Golob, who is a prominent figure in the food service industry within the greater UBC campus community. These (informal) key informant interviews took place with the following individuals:

1. With two GCDS representatives on Wednesday, February 18th.
2. With a handful of residents on the evening of Tuesday, February 24th at the Green College dining hall. These interviews took place while project researchers joined GC residents for a weeknight meal at the dining hall.
3. With all GC Chefs (three dinner chefs and one breakfast chef) during the morning of Thursday, February 26th, 2015, in a meeting area of the GC kitchen area.
4. With Place Vanier Chef Steve Golob, on Wednesday, March 11th, 2015, in the dining hall of Place Vanier Residence at the University of British Columbia. Please see Appendix A for the list of questions that guided this interview.

Place Vanier is a residence on campus that has a mandatory meal-plan for residents, and also has a large-scale dining hall. While the dining hall does cater to the Place Vanier residents through special prices, it is also open to other members of the UBC campus and the public. Chef Golob has invaluable knowledge and expertise that was useful in highlighting key leverage points within the dining hall and meal plan arrangements. These leverage points are where we have tried to focus our recommendations, with the expectation that this will provide the greatest benefit with the smallest changes made by residents, chefs, and the GCDS at Green College. We also believed this interview would help determine recommendations we can make for future

GCDS studies that will build on the findings of our project. Chef Golob has experience not only in meal planning and preparation, but he is also knowledgeable about making meal plans healthy, local, and suitable for a diversity of consumer preferences.

B. Direct Observation

Direct observation employs “seeing” and “listening” to observe the problem (Taylor-Powell and Steele, 1996). The addition of this method benefited by being conducted by an impartial third party (the research team) and therefore does not have the same participation bias that occurs in surveys (Taylor-Powell and Steele, 1996). Direct observations of the meal service area and dining hall were made while attending dinner at Green College on Tuesday, February 24th, 2015.

C. Survey of Residents

Surveys are an appropriate data collection tool when requesting information from respondents such as “satisfaction with policies, program and practices; and views regarding the effectiveness of programs or practices” (p. 13, Office of the Auditor General of Canada, 2012). In this way, using a survey as a data collection tool was a highly valuable method of data collection in this project. Also, because we intended for our sample and our population to be almost identical (depending on the response rate), there would be less difficulty extrapolating findings from the survey to the population of residents at Green College. Surveys are most advantageous when: 1. The population is clearly defined, 2. Individuals can be identified easily for sampling, 3. Significant issues have been elucidated so the survey can be focused, and 4. “Significance depends upon the frequency and extent to which a condition occurs in the population being studied” (p. 14, Office of the Auditor General of Canada, 2012), all of which apply to our

project. For this project, a survey was used to determine the major nutritional concerns of residents at GC. In this way, the survey was intended for a clearly defined population with easily identifiable individuals for sampling. Finally, the survey was focused on the issues elucidated from the informal key informant interviews, and the significance of our findings from the survey was dependent on the frequency and extent that these nutritional concerns occurred within the GC resident population.

For a survey to produce relevant and useful evidence, the data it collects must be reliable and valid (Office of the Auditor General of Canada, 2012). Data from our survey was ensured to have high reliability, by having all residents answer the same survey. This ensures measurement is uniform across all individuals surveyed. Data validity is seen as measuring what you actually want to measure, and can be enhanced in data collection by pre-testing the survey, and ensuring that the data gathered contributes to answering the original question. Before being distributed to GC residents, the survey was reviewed and revised by GCDS representatives, the UBC SEEDS project coordinator, as well as LFS 450 Professor Dr. Andrew Riseman.

The survey of Green College residents was used to determine the primary nutritional concerns of the residents, as well as opinions regarding trade-offs regarding meal ingredients.

Convenience sampling was used, by distributing an online survey (SurveyMonkey) through email to all residents, with those who responded constituting the sample (Castellanos, 2014). A significant limitation to this type of sampling is the possibility of bias that may result from only including people who have time to or are interested in completing the survey in our sample group. Another limitation is that it is impossible for researchers to know that those who make up the sample group actually represent a sample that is able to give a reliable illustration of the

population's normal (Office of the Auditor General of Canada, 2012). However, this sampling method was used in the interest of time, and by striving to have as many people respond to the survey as possible, such as to obtain a sample group that closely resembles the population. Because convenience sampling is non-random, it will likely have a higher level of error, although this can be reduced with a larger sample size (Castellanos, 2014).

The survey was distributed by email to all GC residents on the evening of Wednesday, March 25th, 2015, along with the previous week's weekly meal survey. The survey was open for four days for residents to complete, and closed at midnight on Sunday, March 29th, 2015. Residents who completed the survey and also entered their email address were entered to win a 50\$ gift certificate to the UBC Bookstore on campus. This was used to increase the response rate to the survey. Seventy-two of 96 residents completed the survey (N = 96, n = 72), with a corresponding response rate of 75%. An online survey was used instead of in-person in the interest of saving time. On-line was also preferable as it removed any bias that may have occurred from having nutrition researchers nearby while individuals fill out a survey regarding personal nutritional concerns.

D. Nutritional Assessment

While the survey accounted for the opinions, feelings, and concerns of the residents regarding the nutrition of the meal plan, a nutritional assessment of the meals served at GC was required to gain a more objective estimation. For this project, a nutritional analysis was done on the four recipes found in the following table provided by the GC chefs.

Table i. Recipes provided by GC chefs for the nutritional analysis

Meat A:	Carved Beef Top Butt with whipped Parsnips, Green Beans, and Yorkshire Pudding
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Meat B:	Tazo Chai Salmon With Sweet Pea Sticky Rice and Baby Bok Choi
Vegetarian A:	Beet and Nut Burger With Split Pea Soup
Vegetarian B:	Greek-Styled Tofu Skewers With Tzatziki, Hummus, Brown Rice, and Whole Wheat Pita Bread

The *Guide to Developing Accurate Nutritional Values* was created by Health Canada and the Canadian Food Inspection Agency to help the food industry chose the appropriate method when obtaining nutritional data (2007). This document recommends using an indirect approach for menu planning and recipe calculations (Health Canada, 2007) which we have used for this project. The guide emphasizes that nutrient calculations must account for changes in nutrient levels as a result of processing, transportation and storage (p.14, Health Canada, 2007). Due to the irregular nature of food preparation at GC, however, the effects of processing cannot be accounted for in this study. The accuracy of the analysis also depends on the accuracy of ingredient nutritional values and the homogeneity of the dish (Health Canada, 2007). Additionally, changes in the nutrient profile may arise from substitutions and varying conditions for primary production (Health Canada, 2007). As a result of these many barriers, it is apparent that it will not be possible to conduct an accurate nutritional analysis. In light of this, we have taken the suggestion that non-specific values of ingredients may be used as a guideline to ensure that nutritional needs are being met (Health Canada, 2007). In accordance, we will conduct a nutritional assessment of the various ingredients used in the menu items and compare on a relative basis and suggest changes that may be more consistent with the nutritional goals of the residents.

The program used for the nutritional assessment was eaTracker, a program developed by the Dietitians of Canada and British Columbia Ministry of Health (Dietitians of Canada, 2015). EaTracker's recipe analysis program was used to input ingredient for all four meals provided by the GC chefs and values were obtained for both sexes. The following nutrients were found to be of concern to residents during our direct observation portion of the study; therefore, was used as our indicators for areas of nutritional comparison to the daily recommended intake (DRI) values provided by Canada's Food Guide (Health Canada, 2011) and improvements for the future.

1. Iron
2. Sodium
3. Fat and Fat type

E. Literature Review

The literature review serves two purposes. The first was to gain a broader understanding of context of the methodology of the project. The second was to identify the types of nutritional issues that often arise in large institutions. Through our research we set the goal of discovering commonalities with other dining institutions to identify key leverage points as well as potential solutions that may be applied to GCDS. In accordance with these goals we will be reviewed nutritional studies from other institutions, such as colleges, universities, and hospitals.

Findings & Outcomes

A. Key Informant Interviews: Findings

Green College Dining Society Representatives

The GCDS is a non-profit society responsible for coordinating the meals provided to residents at Green College. The research team met with the President, David Gill, and the Vice-President, Shoshana Deutsh, to discuss the direction for this project. Some background information was provided and key concepts were brought away from this meeting. Specifically, GCDS would like to see that the meals served on the meal plan retain the variety that is currently offered, both through the salad bar and through the variety of main dishes served. The GCDS has heard various concerns from residents, and would like to get a better idea of how Green College residents as a whole feel about the meal plan. David and Shoshana suggested using the Canada Food Guide as a standard and desire a more objective assessment of the nutritional content of the current GC meal plan. Finally, GCDS stressed the importance of consulting the chefs in regards to the needs of this project and to better understand the scope of this project.

Green College Residents

A handful of Green College residents were informally interviewed over a shared meal in the GC dining hall. It is important to keep in mind that these interviews do not necessarily, and likely do not, represent the views of all residents at Green College, and were instead meant to further the research team's understanding of the Green College community and the nutrition-related problem that is the focus of this project. The following are a list of the main concerns expressed by the residents during this informal interview:

- o Portion size → inconsistent, but typically much too large
- o Abundance of certain nutrients → fat and sodium
- o Concerns raised regarding iron deficiencies among residents

- o Concerns regarding weight gain, attributed to GC meal plan
- o Food safety concerns
- o Enjoy the variety provided by the salad bar
- o Content with breakfast meals
- o Often take leftovers from dinner meals for lunch
- o Concerns regarding heavy sauces, sometimes meals too elaborate

Green College Chefs

The research team met with all Green College Chefs, including three dinner chefs and one breakfast chef. There were some key concepts highlighted in this meeting. Specifically, the GC chefs are hesitant to implement changes based on the feedback received in the weekly meal surveys. The weekly meal survey has a low response rate, so chefs are unsure if the comments of the few people that do complete the survey, truly represent Green College residents as a whole. In addition, the GC Chefs highlighted that they are formally trained as chefs, and do not have training in nutrition or dietetics. This has been an important understanding for the research team to carry through this project. However, it was expressed that the weekly meal survey has been very beneficial for receiving feedback when new recipes are tried.

This meeting also called attention to the importance of residents taking personal responsibility for their own nutrition was highlighted during this meeting. The GC Chefs also indicated that they have significant financial constraints, and while they do have considerable buying power, they do not have the same buying power that other institutional dining halls might have, such as hospitals or other residential cafeterias. Therefore, cost of ingredients is the most significant barrier to implementing many changes suggested/requested by residents. The GC

Chefs reiterated some of the statements made by the GCDS, including that residents seem to be highly content with breakfast, due to the large number of options available to residents for this meal. Finally, the GC Kitchen is almond-, peanut-, hazelnut-, and cashew-free, so these are not options for “alternative”/non-meat protein sources. Finally, the chefs indicated that they rarely follow recipes.

Place Vanier Chef, Steve Golob

The meeting with Steve Golob was to give the research team a better understanding of kitchen dynamics and the barriers that a chef might face in this type of a situation. In this meeting, the importance of keeping recipes simple and leveraging purchasing power were highlighted.

B. Direct Observation: Findings

Direct observations of the dining hall and method of meal service employed were made while the research team joined GC residents for a meal at the college. It is important to note that these findings represent only one dinner meal at GC, and are not presumed to be comprehensive or complete, but rather an opportunity for the research team to “experience” the dining hall and meals. Key findings from these observations include:

- o Variety of salad bar options, with many dressing options that are “add yourself”
- o Everyone receives the same size portion
- o Desserts are in pre-portioned containers

C. Green College Resident Survey: Findings

Note: The findings presented in this section represent the summarized results obtained through the online survey of residents regarding their nutritional concerns related to the dinner meals served each week at Green College. To review the exact questions included in the survey and the

full, non-summary version of the results obtained, please see the Appendix. In addition, it is important to keep in mind the survey distributed to Green College residents was in regards to dinner meals served at Green College, not breakfast.

Background

As mentioned previously in the methodologies section of this report, the response rate for the online survey administered to GC residents was 75% (N = 96, n = 72). Sixty-nine percent of respondents follow the meat meal plan, 17% follow the vegetarian meal plan, and 14% follow the omnivore meal plan.

Weekly Meal Survey Response Rate (Distributed by GCDS)

The weekly meal survey is an online survey distributed to residents at the end of each week to provide the opportunity to give feedback on the week's meals. However, according to the survey of residents used for this project, the response rate for the weekly survey at GC varies significantly. Nineteen percent of respondents stated that they complete the survey four times per month (every week), 11% complete it three times a month, 15% complete it twice a month, 14% complete it once a month, 18% respond only when they have a comment that they deem to be necessary feedback, and 22% never complete the survey. Information obtained from the written responses indicate that for those that complete the weekly meal survey, the common motivation is to inform the kitchen of their likes and dislikes. The respondents that indicated they never complete the weekly survey expressed that they have minimal motivation to complete the survey because they are unsure and sceptical as to whether the results are thoroughly reviewed, and/or actually have the ability to initiate change.

Nutritional Concerns of Residents

The most significant nutritional concern related to meals served at GC is “too much fat”, with 44% of all respondents indicating this as a personal nutritional concern. The second greatest nutritional concern was found to be too much sodium at 36% of the survey population. Other significant nutritional concerns include too much sugar (32% listed as a concern), not enough iron (19% listed as a concern with 11% of participants declaring they actually have an iron deficiency), and too much dairy (13% of the population). Conversely, 31% of the survey respondents indicated that they do not have any nutritional concerns.

The survey questions regarding the nutritional concerns of GC residents were administered to illuminate residents’ perspectives on the food at GC. While general trends indicated too much sodium, fat, sugar, dairy, and not enough iron, there appeared to be distinguishing trends among the various meal plan types. Those who follow the vegetarian meal plan illustrated that their primary concern was too much fat and sugar with secondary concerns around sodium, iron, and dairy content. Residents under the meat meal plan, however, said that sodium and fat were their primary concern, with sugar as the secondary concern. More specifically, 24% of the GC survey respondents declared that they have been diagnosed with a diet-related health condition by a medical professional. Of the 24% of residents with a medically diagnosed diet-related condition, 65% of these were iron deficiencies, while other less prevalent medical diagnoses included Irritable Bowel Syndrome, diabetes, gluten intolerance, vitamin B12 deficiency, and hypertension.

Dinner Portions

Residents’ opinions regarding dinner portion size at Green College were divided relatively evenly between three different categories. These categories included those who stated

the dinner portions sizes are: (1) Too large, but leftovers are appreciated (36%), (2) Just right (33%), and (3) Too large (28%). A minor number of respondents expressed that dinner sizes at GC are too small (3%). It was found that 64% of respondents value smaller portions of higher-quality ingredients, compared to 15% that value larger portions of medium-quality ingredients; Meanwhile 21% of respondents indicated that they do not want GC's meal size versus quality ratio to change. +

Salad Bar Bowl (Allowable Portion)

The salad bar at Green College is self-serve and residents can take up to one bowl full of salad. Therefore, because the serving size is determined by residents with the total portion size capped by the size of the salad bar bowls, this survey asked residents about their perceptions regarding the size of the salad bar bowl, rather than salad bar portion size. The bowl size given to GC residents at the salad bar was rated by 71% of respondents as being the right size, while 17% said that bowls were too small. Through written responses in the open comment box, residents expressed the need for greater consistency with the salad fixings made available, stating that more fresh vegetables are a priority over pre-dressed and grain based options, such as pasta salads. Upon being asked whether residents would opt for a smaller main course portion for additional servings at the salad bar, 56% said they would not, compared to the 44% that said yes.

Meal Type Preference

When asked if they prefer elaborate meals with restaurant flare or back to basics simple home cooking, 13% of residents indicated they prefer restaurant style, 59% indicated they prefer simple cooking, and 28% elected "other". The comments written by residents who chose "other"

indicated that they would like to see a mix of the two, with many residents indicating that they would be content with simple cooking most nights, but would enjoy elaborate meals one to two times a week.

Willingness of Residents on the Meat Meal Plan to Accept a Meatless Meal

Of the respondents on the meat meal plan (69% of our sample), 78% said that they would be willing to have one meatless meal per week. Fourteen percent were not open to a meatless day of the week, while the remaining 8% maintained that the quality and nutritional value of the potential weekly meatless meal would have to be adequate to consider one meatless night of the week.

Sit-in Meals vs. Meals To-go

Green College residents have the option to take their entire meal to go, however 47% of residents eat all meals in the GC dining hall, while 36% take 1-3 meals a week to go. Ten percent of respondents take 4-6 meals to go, 3% take 7-9 meals to go, and only 4% take all meals to go.

Canadian Food Guide Knowledge and its Application

Forty-nine percent of our sample was not familiar with Canadian Food Guide recommendations. Meanwhile, 22% of respondents considered themselves to be somewhat familiar and 29% declared that they are well acquainted with the food guide recommendations. Of the 29% that consider themselves to be well informed with the Canadian Food Guide, 35% actually put the recommendations to use. Of the respondents who do not practice Canadian Food Guide recommendations all of the time, 40% did not know whether they practice them, 25% practice them some of the time, and 25% never practice them. +

Possibility of a Consulting a Nutritionist

Respondents were asked whether they would capitalize on the opportunity to see a nutritionist if a free service was made available to GC residents. Upon being asked as to whether they would use such a service, 46% said yes, 26% said no, and 28% were not sure.

Food Choice Influences Outside of GC Meals

Green College residents are responsible for all of their lunches, as well as two breakfast and two dinner meals each week. The factors that inform resident's food choices for these meals, ranked from most to least common, include: taste (86%), cost (79%), health (78%), convenience (60%), environmental (36%), political and/or animal welfare (25%), local (24%), organic (19%), cultural (14%), religious (6%), and social (1%).

Satisfactory Components of GC Meals

When asked which aspects of the GC meal plan are currently satisfactory, three main themes emerged. Despite surveying residents regarding GC dinners, it was voiced numerous times that residents are very satisfied with breakfast options at GC. Although the survey did not seek to investigate breakfast at GC this was a very common response and therefore the result could not be ignored. The second meal satisfaction theme maintains that residents are very satisfied with the salad bar especially when lettuce and toppings do not come pre-dressed. Finally survey respondents noted that they like having the option between a piece of fruit and a dessert at dinner.

Recommendations for the GC Meal Plan

Changes that residents would like to see integrated into the GC dinner meal plan include simpler cooking, less salt and fat in meals, and the standardization of portion size. Several respondents

revealed that they enjoy the simpler meals at GC and would like to see more of them. Residents' definition of simple cooking corresponded to the desire for less sauce on meals. With both salad bar vegetables and dinner entrees residents would like to see sauce on the side. Survey respondents recommended reducing the amount of salt and fat in meals. The desire for healthier fats e.g. oil over animal fats was repeatedly expressed. Lastly residents commonly expressed the need for standardized portions especially for things like mashed potatoes and other starchy carbohydrates to allow for balanced dinners that have appropriate ratios of protein, vegetables, and carbohydrates.

D. Nutritional Analysis: Findings

The daily recommended intake (DRI) for females is 18 mg of iron, 1500 mg of sodium, 42-73.5 g of fat, and 1900 calories. The DRI for males are 8 mg of iron, 1500 mg of sodium, 60-105 g of fat and 2700 calories.

Meat A was found to have 10.6 mg of iron, 1301.2 mg of sodium, 35.4 g of fat, and 839 kcal. Meat B was found to have 3.4 mg of iron, 2275.6 mg of sodium, 58.6 g of fat, and 909 kcal. Vegetarian A had 12.4 mg of iron, 4717.3 mg of sodium, 75.2 g of fat, and 1472 kcal. Vegetarian B had 15.8 mg of iron, 799.1 mg of sodium, 53.7 g of fat, and 1061 kcal.

Table: #1 Meat A. Roast Beef

Age 19-50yrs	Female/recommended	Male/recommended
Iron (mg)	10.6/18	10.6/8
Sodium (mg)	1301.2/1500	1301.2/1500
Fat (g)	35.4/42-73.5	35.4/60-105
Calories (kcal)	839/1900	839/2700

Table: #2 Meat B. Chai Salmon

Age 19-50yrs	Female/recommended	Male/recommended
Iron (mg)	3.4/18	3.4/8
Sodium (mg)	2275.6/1500*	2275.6/1500*
Fat (g)	58.6/42-73.5	58.6/60-105
Calories (kcal)	909/1900*	909/2700*

Table: #3 Vegetarian A: Beet Nut Burger

Age 19-50yrs	Female/recommended	Male/recommended
Iron (mg)	12.4/18	12.4/8
Sodium (mg)	4717.3/1500	4717.3/1500
Fat (g)	75.2/42-73.5	75.2/60-105
Calories (kcal)	1472/1900	1472/2700

Table: #4 Vegetarian B: Greek Sample Platter

Age 19-50yrs	Female/recommended	Male/recommended
Iron (mg)	15.8/18	15/8
Sodium (mg)	799.1/1500	799.1/1500
Fat (g)	53.7/42-73.5	53.7/60-105
Calories (kcal)	1061/1900	1061/2700

Discussion

A. Survey of Residents

Survey response rate

The weekly survey is used to provide constructive feedback to the kitchen and give a good indication of the residents' satisfaction with the meal plan (D.Gill personal communication, 2015). The weekly survey is an important tool that not only allows for communication, but also allows residents to maintain some autonomy over their food choices. Response rates, however, appear to have declined as the term progressed (D.Gill personal communication, 2015). Through the survey that was administered for this project we found that this decline was partially attributed to a feeling of discouragement among the residents, as they perceived that the kitchen did not accommodate the input from the surveys. In a study that evaluated social interactions of learning in the workplace it was stated that an effective way to achieve community goals is through shared-problem solving and negotiations (Collin and Valleala, 2007). The weekly survey allows residents to communicate with the chefs, but the only means by which chefs are able to communicate with the residents is through the meals. When the chefs are not able to meet the requests of the residents there is no means to acknowledge that these requests have been considered. In this way, the chefs are not able to negotiate with the residents, and thus community goals cannot be fully met. To maintain the sense of cohesion and community between the residents and the staff, the chefs need a means to communicate when requests cannot be met.

Nutritional Concerns

Through the Survey we determined that the residents of Green college are particularly concerned with excessive fat, sodium, and sugar in the dinners, with excessive dairy and insufficient iron being of moderate concern. When placing Green College in the context of the Canadian food system it is not surprising that the residents are concerned about fat, sodium and sugar. In a report issued by the Canadian Journal of Public Health, the author determined that the majority of Canadians perceive healthy eating habits to include low fat content, low salt content and low sugar content and that these nutrients are of big concern in our country (Paquette, 2005). The author of this report also noted that dairy is often associated with a high fat content among Canadian adults (Paquette, 2005), which is a possible reason behind the concern with dairy in the meals. The origin of these concerns may be either reflective of the Western diet and the actual content of the food, nutrition education, or the general portrayal of these nutrients among our society, particularly through the media (Paquette, 2005).

Low iron content is also somewhat of a concern among residents. It should be noted that 29% of those who were concerned about iron have been medically diagnosed with an iron deficiency. This concern with iron can therefore be largely attributed to the prevalence of iron deficiency. As for the other 71%, there was little evidence in the literature behind the possible rationale for this concern.

Regarding the Vegetarian Meal Plan:

Upon comparison of the nutritional concerns and perceptions between vegetarians and meat-eaters in this study, there appears to be only slight differences between the two groups. While fat content remained the top concern of both parties, vegetarians illustrated more concern with sugar content.

Allen et al. (2000), noted that one of the primary reasons behind the adoption of a vegetarian diet is for health. This is consistent with the epidemiological study, that found that vegetarians consumed far less sweets and non-water drinks than those who ate meat (Orlich et al., 2014), which are often perceived to be unhealthy (2005). These studies suggest that the greater concern over sugar content among GC vegetarians may be reflective of the general perception of sugar among vegetarians, and the lower tolerance for sugar in the diet rather than the relative (to the meat meals) sugar content of the meals.

As for the elevated concern over iron among the vegetarians, it should be noted that iron deficiency is more common among vegetarians than omnivores (Kendler, 2003). The frequency of the diet-related ailment among the general vegetarian population is likely the reason behind the concern among vegetarians at GC.

Regarding the Meat Meal Plan

The residents that follow the meat meal plan showed greater concern over sodium and fat content, than they did for iron or sugar. Fat content is often associated with meat intake as outlined by the Food and Agriculture Organization of the United Nations (Bender, 1992). Bender (1992) indicates that there is a common perception that meat has a large saturated fat content causing many individuals to worry about the health implications of meat consumption. As for sodium, there was no indication in the literature as to why this was of greater concern for the meat-eating residents and less of a concern for vegetarian residents.

Portion Size

While portion size was not of concern for the majority of the residents nearly two out of three said that they did not want to consume all of the food that was provided to them in the one

sitting, and would either take it to go for lunch or would dispose of the extras. These findings suggest that it may be possible to reduce the quantity of food prepared and thereby reduce costs associated with the extras. While many of the residents are content with the leftovers for lunch, it should be taken into consideration that it is not mandatory for Green College to provide lunch to the residents.

As for the salad bar, the majority of residents appear to be content with the size of the bowls, with only a few who would have liked to see and increase in the size. These findings suggest that the salad bar bowls are currently an adequate size for GC residents.

Home-Style Versus Restaurant Style Meals

The survey revealed that residents exhibited a preference for home-style meals at GC. Favouring home-style cooking is consistent with the results of an opinion survey, which found that the majority of Canadians view meals that are cooked or consumed in the home as healthier than those cooked or consumed in a restaurant (Paquette, 2005). This suggests that meals that are considered “home-style” may be perceived to be healthier than those that contain more ingredients and are elaborately prepared.

Familiarity with the Canadian Food Guide

The Canadian Food Guide is an educational tool that promotes nutritional health among Canadians (Health Canada, 2007). In a study seeking to determine grocery shoppers’ perception of the food guide and their use of it in the shopping setting, it was determined that the majority of those surveyed found the nutritional guide to be helpful when making nutritional choices (Garcia and Piche, 2001). The findings from this study suggest that those who are familiar with the food guide will be more likely to feel comfortable with their food choices and its nutritional

content. The majority of GC residents were not familiar with the food guide or did not practice the food guide. Our findings suggest that providing residents with an educational tool, such as the food guide would allow them to make food choices in which they would be satisfied.

In conjunction with the findings from the survey on the perception of the nutritional content of the food, the nutritional analysis will help to reveal whether the concerns can be resolved through education and communication, or whether the issues must be resolved in the kitchen.

Risks and Limitations

There were a few risks that were associated with the methodology of the survey. Firstly, we sought to avoid leading or biased questions; this is not a simple feat as everyone has their own perception of nutrition. We were also careful as we wanted to make sure that none of our questions were going to create tension between GC staff and its residents. This is particularly important as Green College's collaborative approach to meal-time is essential to maintain the sense of community at the residence. Finally, we wanted to avoid making assumptions, as we realized that we were working with individuals with unique backgrounds and understandings of nutrition and GC dining.

The survey method was also accompanied by a few limitations. It should be noted that the response rate of the residents was not 100%. As a result it is likely that there would have been a small response bias in which a particular group was not fully represented. Additionally, there were a number of questions that were either open-ended or could have been perceived differently. For example, upon surveying residents about the food's sugar content, it was not clear if this was referring to simple sugars or carbohydrate content. Finally, the nutritional

concern questions were based on the informal interview with a handful of the residents, as a result, it is likely that not all of the nutritional concerns of the cohort were addressed.

B. Nutritional Analysis

The findings are for a single meal compared to the DRIs for males and females. In addition, only four meals were analyzed out of the whole GC meal plan; therefore, it is not an accurate representation of the entire GC meal plan but may be used as a reference for future meal plans. The recipes provided by the chefs at GC mainly contain estimates of the amounts of ingredients used; this may skew some of the data generated by eaTracker's Recipe Analyzer. Another point to consider is that there are biological differences between sexes which determine the amount of nutrients needed; for example, males generally require more nutrients and energy intake, while females require more iron. The height and weights inputted into eaTracker are meant to be reference values for healthy individuals in the North American context. These recommendations are meant to encompass 97% of the population at GC (Health Canada, 2006). Individual requirements are specific, and often require the help of health professionals to determine such requirements accurately. These calculations were done based on the assumption that GC graduate students are following a sedentary lifestyle.

Iron content was within the recommended ranges for both sexes. Three of the four recipes had exceeded the DRI for males, while females had their DRI for iron met. Excess iron is acceptable as long as intakes stay below the 45 mg tolerable upper intake level (UL) (Dietitians of Canada, 2014; Health Canada, 2005). Low iron content could be a potential issue in meat B especially for women; higher iron intakes are required for females due to its loss during the

menstrual cycle (CDC, 2011). Vegetarians also need 1.8 times more iron due to the differences in bioavailability of iron. Iron from plant sources, or non-heme iron, is less bioavailable than iron from animal sources, or heme iron; in other words, non-heme iron is less readily absorbed by the body. Inadequate iron intake may lead to iron deficiency where symptoms may include tiredness, paleness, and irritability. More severe cases of iron deficiency may lead to health concerns such as iron deficiency anemia. Statistics Canada (2012) states that approximately 5% of all Canadians have low iron status, but upon looking at just females this rate increases to 8%. Consuming foods rich in vitamin C during a meal may help to improve iron absorption. Tannins found in coffee and tea, oxalic acid from raw spinach, phytates from wheat have an inhibitory effect on iron absorption. They bind tightly to free iron which prevents its absorption (Xu, 2014; Hurrell & Egli, 2010). Excess ions such as calcium or copper may lead to competition for absorption in the body (Xu, 2014). It is suggested that foods high in tannins, oxalic acid, phytates, calcium, and other ions be avoided during meals.

Sodium was over the 2300 mg UL in half of the recipes analyzed (Health Canada, 2005). In a study done by Strazzullo et al (2009) revealed a significant increase in stroke and CVD risk in relation to high sodium intake. Other associations the study found include hypertension, asthma severity, stomach cancer, and increased risk of osteoporosis (Strazzullo et al, 2009). The average Canadian adult consumes approximately 3400 mg each day (Health Canada, 2012). Among people aged 9-70 years 85% of males and 80% of females exceeded the UL for sodium (CCHS, 2004). A reduction of 1840 mg/day of sodium intake can decrease hypertension prevalence by 30% and cardiovascular events by 13%, making it a cost effective and efficient way in minimizing cardiovascular disease (CVD) (Health Canada, 2012).

With the exception of fat content in Vegetarian A for females, fat content was within the DRI for both sexes. It is important to note that the fat content was for one meal of the whole day. Some meals such as Vegetarian A and B and Meat B are already about half of the DRI for fat for males and close to the upper intake range for females. In a report by Public Health Agency of Canada (PHAC) and Canadian Institute for Health Information (CIHI) (2011), they found that 1 in 4 Canadians were obese. Obesity is associated with high fat consumption and low physical activity levels (Public Health Agency of Canada, 2011). Fats naturally come in two forms, unsaturated and saturated; saturated fats are known to increase levels of low-density lipoprotein (LPL) cholesterol. In addition to obesity, LPLs are responsible for the formation of plaques in artery walls and thus CVD. Saturated fats may be sourced from animal fats, coconut oil, or dairy products (Health Canada, 2012). The healthier unsaturated fats are known to lower LDL cholesterol (Heart and Stroke Foundation, 2012; Alizadeh-Pasdar, 2014). Unsaturated fats may be found in vegetable or fish oils, and nuts and seeds (Health Canada, 2012).

Recommendations

To begin, an overarching and essential recommendation for both residents and GC dining staff is continued communication amongst both parties. As noted, some residents feel reluctant to fill out the weekly survey because they do not think that survey results are initiating noticeable change. Meanwhile, chefs are hesitant to implement big changes because it is hard to know whether the feedback from the surveys are representative of the majority of resident's preferences. Therefore we recommend explicitly communicating to residents what changes are outcomes of the survey results, and why other suggested changes might not be feasible; this is

recommendation that can be implemented immediately. Chef Steve Golob spoke about the importance of constantly seeking out the feedback of those eating your food, and continuing meal plan components that work while discontinuing those that do not work. The power of communication should be celebrated and fully utilized.

Recommendations for GC Dining Staff

Simple recommendations that can be implemented on the short-term by the chefs have the ability to make a big difference. Our first recommendation is to put sauce on the side of meals as much as possible. By allowing for sauce on the side, residents can cater to personal tastes and allow for nutritional flexibility. Vegetables and toppings at the salad bar should always be undressed giving residents the option to dress their own salad. Additionally, a standard scoop size for things like potatoes and rice should be used to meet Canada food guide serving sizes. This will help control for serving size consistency. Given that 28% of respondents find GC portions too large, if residents would like a half scoop, we recommend that this be permitted to avoid food waste (with no price change). We recommend that GC meals focus more on simple dinner options. We defined simple as containing less sauce and fewer ingredients. Not only have residents expressed that they prefer GC's simpler meal, we believe this will improve nutrition by reducing excessive fat and salt intake, while cutting ingredient costs.

Recommendations concerning the key nutrients we analyzed include choosing vegetable oil instead of lard to cook with, which may help lower saturated fat intake while increasing unsaturated fat intake. Substituting items such as dairy with their low fat counterparts may also help to lower saturated fat intake; the same may be applied to sodium. Low sodium items such

as soy sauce may have approximately 40% less sodium than regular soy sauce (Kikkoman, 2015). Another recommendation is to provide saltshakers for residents to use during meal times while chefs use less salt in their recipes. This option allows residents to have more customization over the taste of their food while the kitchen can keep food costs low.

Recommendations to the GC Board of Directors

A simple and effective way to make informed nutritional choices is to refer to the Canadian Food Guide (Garcia and Piche, 2001). We recommend posting a copy of the Canadian Food Guide as a reference in the serving area of the dining hall. Residents would be able to refer to it while they are making choices regarding things such as portion size, salad bar options, or the dessert options.

Recommendations for GC Residents

Our overall recommendation for GC residents is to be mindful. Be mindful of the context whereby 96 individuals from different backgrounds are being fed on a standard meal plan. A standard meal plan will never be the perfect meal plan for nearly 100 different individuals. Secondly, residents should be aware of their own unique nutritional needs that vary according to unique biological variables and activity levels. The meal plan offers a considerable amount of choice and residents will benefit if they make informed dietary decisions based on their own needs. Referring to the Canada Food Guide will help determining an individual's needs. Residents should also be mindful of portion size at GC. The portions given may be perfect for some, but much too big for others. When in doubt remember the motto "eat slow and take it to go."

To promote better iron absorption, especially with a vegetarian diet, one should consume foods high in vitamin C with their meals. Vitamin C reduces iron to its more bioavailable form, Fe²⁺ (Xu, 2014). In addition, inhibitors should be avoided during meals. Some inhibitors such as oxalic acid found in raw spinach may be deactivated by cooking spinach. Whenever possible, heme iron should be consumed as they are more readily absorbed by the body. Generally red meats and organs, such as the liver, are richer sources of heme iron; examples of good sources of non-heme iron are lentils or soybeans (Dietitians of Canada, 2014).

In order to control fat and sodium intake, it is important for residents to keep track of what they consume during the day. For example, if a high fat meal was consumed for breakfast then choose a lighter meal for lunch or dinner. Each person's nutritional needs are unique. Fat intake should not be eliminated altogether as fats are necessary for a healthy life. Instead, saturated fat consumption should be limited while increasing unsaturated fat consumption (Health Canada, 2012).

In the appendix there is an educational poster that will help residents make informed food choices to get the most out of their GC meal plan.

Future Project Recommendations

Considering that 60% of survey respondents said that they would definitely consult with a nutritionist if made available to GC, we suggest that a future project at GC could recruit an upper year UBC dietetics students to gain practical experience by performing a full nutritional analysis of GC meal plan and offering nutritional counselling to residents as needed. This would be favourable for GC's residents and staff to optimize nutrition while also offering an advanced dietetics student an opportunity to get real world experience.

Scenario Evaluation & Feedback

Through key informant interviews, we were able to obtain various perspectives of stakeholders, the experiences of residents and chefs, and also understand logistical concerns of GCDS. Interviews with residents resulted in a vast amount of data collected, and key trends were observed. This enabled us to successfully reach our goal of identifying the major nutritional concerns of residents living at GC. Our interaction with the residents also provided a channel for them to voice concerns they would otherwise not have shared, considering the weekly average response rate of dining surveys. Direct observation of residents in the dining hall during mealtime presented valuable and unbiased data of realistic interactions between residents. We were able to observe behaviour that supplemented and helped form subsequent survey questions. This observation experience was invaluable to the latter portion of this project.

Interviews with GCDS highlighted managerial and logistical concerns surrounding meal planning. This helped our team expand our understanding of the technicalities of meal planning and determine feasibility of recommendations that would be suggested at the end of this project. The timely and enthusiastic communication between GCDS and our team throughout the span of the project was irreplaceable and allowed for quick and effective resolutions of the obstacles that we encountered along the way.

As our team consists of members of various backgrounds, interviews with GC chefs provided an understanding of experiences within the foodservice industry. Through communication and direct observation of the GC food service professionals, we came to understand the style of cooking at GC, and considerations when catering to a large population

with specific and diverse food preferences and needs. In addition to interviewing key stakeholders, our team wanted to extend our understanding to an even larger scale by interviewing Chef Steve Golob of Place Vanier. This interview enhanced our knowledge and helped put into perspective and appreciate the difficulties surrounding catering to the masses.

Not only did the interviews fulfill our first goal of identifying major nutritional concerns of residents at GC, it also allowed the team to gain knowledge and appreciation of the different participant experiences in the GC food system. Considering the breadth, quality, and amount of data collected from all key stakeholder interviews, we feel that this portion of the project was extremely successful. Data obtained from these interviews have been successfully incorporated into survey questions that are tailored to be relevant and realistic of resident dining hall experiences.

The survey administered to GC residents were a key component to this project, and was extensively promoted with incentives provided in order to have the maximum amount of responses. In the end, we attained a very high response rate of 75%, compared to the average weekly response rate of 20%. While the survey employed convenience sampling resulting in sampling bias, the error is significantly reduced due to the large sample size in this project. The team feels that this is quite an accurate representation of residents, and that common trends in responses are an honest illustration of resident experiences. Incorporating GCDS information communicated through the previous interview phase, the survey additionally served as a tool to gauge resident responses to proposals that GCDS may potentially implicate in the future. With dual functionality, the survey phase of the project was considered to be successful on many levels.

Applying results from the interview and survey phases, we were able to analyze the nutrition profile of four recipes provided to us by GC chefs via online software. This helped us obtain results that were both accurate and objective. The results helped legitimize or dispel concerns that residents previously had- iron in the sample meals were shown to be sufficient, fat was within recommended ranges, while sodium levels were much higher than recommended daily values. Here we have achieved our second research goal of translating nutritional concerns into real life reflections of diet quality in residents. These results further emphasize the importance of nutrition education and awareness as a responsibility held by all individuals, and that one cannot solely depend on food service professionals as they are trained in culinary arts, and may not be familiar in the science of human nutrition. While the nutrient profile of meals is limited to only the four most popular meals and may not reflect all GC meals to its entirety, this quick snapshot is a valuable reference for future meal planning and nutrition considerations.

As the final phase of our project, we created a number of recommendations that were geared towards GC residents and also chefs. We took into account all of the information and observations collected throughout the entire duration of the project to create recommendations that could be realistic, easily implemented and followed in the shortest amount of time. Additionally, our team decided to go beyond our scope of this project to create a poster of recommendations that would be placed in a highly visible area of the GC dining hall. We strongly believe that this additional deliverable will help enable our project to establish a strong foundation at GC on an ongoing basis. An additional outcome that we have observed post assessment of this project is that communication between all key parties were strengthened and enhanced. We noticed an increase exchange of feedback and enhanced

understanding between parties. We hope that future research teams would be able to continue our journey by potentially increasing the validity of meal assessment by analyzing more GC meals, bridging more communication platforms between various areas of studies, to strengthen the effectiveness of feedback, and to raise awareness of nutrition education to all.

Group Reflection

This project commenced with a wide range of possible research avenues to address GC's meal plan. Through interviews with all stakeholders and frequent communication with our main stakeholder, we were able to narrow down the project's scope to focus predominantly on the nutritional aspect of dinners at GC. A challenge that our group had to confront was time; the scope of our project became narrower as time was a constraint. Despite the short timespan we had to review our survey results and nutritional analysis data, our team was able to quickly come up with suggestions that would be simple and beneficial to all parties at GC. For example, we found that instead of iron being an issue, it may have been lack of knowledge on how to optimize its absorption in the body.

Media Release

As Land and Food System 450 students studying at the University of British Columbia, we carried out a nutritional analysis examining the dinner meal plan at Green College (GC), an on-campus graduate residence. By analyzing the nutrients and caloric intake of recipes used at GC, administering a survey to Green College residents, and interviewing GC dining staff, nutritional concerns were addressed by making effective recommendations for both staff and residents. This UBCFSP demonstrates the importance of communication amongst dining staff and residents at GC particularly when varying tastes, nutritional, and economic preferences are at play. Communication was also an essential ingredient within our research team as we carried out project research and reached out to members of the UBC Food System community. Participating in a UBCFSP was a unique opportunity to engage in a project that instigates positive change on our university campus, while developing leadership skills and community connections.



Photo of the GC Nutritional Analysis Team at GC Dining Hall

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Appendices

Appendix A: Steve Golob Key Informant Interview Questions

1. *When you are designing a meal plan or considering a recipe to be used in a meal plan, how much consideration do you give to nutrition? Which aspects of nutrition (i.e. mineral content, fat content, quality of ingredients, salt content, etc.)*
2. *What factors do you consider when determining a standard portion size? Do you think it is feasible to offer different portion sizes at Green College, based on the description we have provided you with?*
3. *Can you advise on how to balance sourcing local/high quality ingredients with a limited budget?*

4. *Do you have any advice for balancing the diverse concerns of residents with the capacities and budget of the kitchen?*
5. *Can you identify any leverage points (areas to implement change) within the meal plan arrangement to allow for the smallest, most feasible changes that provide the greatest benefits for both the kitchen and residents?*
6. *In your experience, what are common barriers that prevent changes from being implemented?*

Appendix B: Poster for Green College Residents

GREEN COLLEGE | UBC
Scholarship in Society

GETTING THE MOST OUT OF YOUR GC MEAL PLAN!

Worried about the calories and/or fat?
Eat Slow and take it to go!

TIP: Review the Canada Food Guide and become familiar with appropriate portions and the recommended servings for *your* body's needs.

Did you know? The UBC Health and Dental Plan includes a subsidy for dietician consultations.

Are your iron levels low?

TIP: combine foods within meals to increase your iron absorption!

- CHOOSE: HIGH VITAMIN C foods (red peppers, citrus, strawberries, broccoli)
- AVOID: HIGH CALCIUM foods (when you are eating iron) (such as milk products)
- SOURCES OF IRON: dark green vegetables (other than raw spinach), red meat, legumes, nuts, sunflower & pumpkin seeds and eggs
- Don't forget to mix up your greens!

Appendix C: Raw Data from On-line Survey of Green College Residents

-See attached email with all GC survey questions and raw data.