UBC Tap Water Study

Prepared by: Benson Chen, Dorothy Wong, Krista Soobotin, Negar Karami, Sara Chan

Prepared for:

Course Code: FNH 473

University of British Columbia

Date: 14 April 2021

SEEDS Sustainability Program

UBC sustainability

UBC Tap Water Study

Community-Based Experiential Learning (CBEL) Final Report

Social Ecological Economic Development (SEEDS) Sustainability Program

UBC Food Services

UBC Wellbeing Food and Nutrition Committee

Benson Chen

Dorothy Wong

Krista Soobotin

Negar Karami

Sara Chan

FNH 473

April 14, 2021

Executive Summary

Sugar-sweetened beverages (SSBs) are the highest source of added sugars in the Canadian diet (Government of Canada, 2018a), and university-aged adults are the demographic that consume the highest amounts of SSBs (Di Sebastiano et al., 2020). SSB intake of UBC students is concerning due to their negative impact on health. One way that UBC organizations are addressing SSB intake is by promoting tap water. UBC Wellbeing launched the Healthy Beverage Initiative (HBI) and related UBC Drinks Tap Water campaign to promote tap water consumption and reduce SSB intake.

FNH 473 Group 7 conducted a Tap Water Study in collaboration with UBC Social Ecological Economic Development (SEEDS) Sustainability Program, UBC Food Services, and UBC Wellbeing. The goal was to gain insight into UBC students' beverage choices and perceptions, both on- and off-campus, to inform UBC's tap water campaign. Short-term objectives include providing survey results on beverage consumption habits of UBC students. Medium- and long-term objectives include this study being used to inform UBC programs and policies to increase tap water consumption and reduce SSB intake.

Survey results consisted of 161 complete responses, the majority of whom reported drinking water daily, and many participants (n=70) reported choosing tap/fountain water. 10% of survey participants did not believe their tap water was safe to drink at home, while 23% of survey participants did not believe that tap water was safe to drink at UBC. When asked to select the main factors that influence drink choices, taste and nutrition were revealed as the top factors influencing their intake.

To evaluate the project process, quantitative indicators include the number of survey channels used and the number of survey responses received (n=161). The five channels used included Facebook and WeChat group chats, Canvas class emails, Instagram, class announcements, and peers of team members. Qualitative process indicators include whether the survey results were useful for the community partners and whether they gained knowledge from our findings. To evaluate the project outcomes, two indicators: (1) whether the findings were used in future interventions and (2) whether the findings helped achieve a 50% reduction in SSB consumption on the UBC Vancouver campus, which can be used in the future to assess the survey impact.

Table of Contents

Introduction

To support UBC's vision for a nutritionally sound campus, numerous on-campus organizations such as UBC Wellbeing, UBC Food Services, the AMS, and Student Housing services are promoting tap water consumption and creating a healthier food environment (UBC Wellbeing, n.d.) For example, the Food and Nutrition Committee of UBC Wellbeing launched the Healthy Beverage Initiative (HBI) to "promote [tap] water consumption and reduce sugar-sweetened beverage consumption at UBC" (UBC Wellbeing, n.d.).

There are two main motivations for programs like the HBI. First, not all members of the UBC community are aware of the safety of the UBC Vancouver (UBCV) campus' tap water (Di Sebastiano et al., 2020). Secondly, potable tap water is a healthier option than beverage alternatives containing added sugars. Sugar-sweetened beverages (SSBs) such as soft drinks, fruit juices, and sports drinks are among the top sources of added sugars among Canadians' diets and are associated with negative health outcomes such as dental caries, hypertension, and diabetes (Di Sebastiano et al., 2020; Government of Canada, 2018a; Vartanian et al., 2007).

This community-based experiential (CBEL) project, UBC Tap Water Study, aims to inform the HBI's tap water campaign. The study was undertaken by UBC Food Services, UBC Wellbeing, and FNH 473 students with the support of the Social Ecological Economic Development Studies (SEEDS) Sustainability Program. An overview of this CBEL project's stakeholders is presented in Appendix C. The UBC Tap Water Study gathered insights into UBCV students' beverage consumption behaviours and perceptions through an online survey.

Due to the novel coronavirus pandemic, the UBC Drinks Tap Water was halted as UBC shifted to remote learning. With students able to study remotely from anywhere in the world, UBC Food Services and UBC Wellbeing wanted to determine whether students have access to safe tap water. The survey asks what UBC students choose to drink and whether access to safe tap water was possible during the 2020-2021 academic year. An additional goal of the project is to suggest the next steps for the tap water campaign. Gaining a better understanding of students' drinking behaviours will allow for better-targeted interventions in the future.

Situational Assessment and Planning Framework

Problem: Sugar-Sweetened Beverage Consumption

Current trends from Statistics Canada show that water consumption, regardless of the source (e.g., tap, bottled), in Canada is increasing and SSB consumption is decreasing (Garriguet, 2019); however, Health Canada still reports SSBs as the highest contributor of added sugars in Canadian diets (Government of Canada, 2018a). Consuming large amounts of sugar can lead to various health concerns including having negative impacts on dental health and body weight (Government of Canada, 2018b). Drinking SSBs may result in excess caloric intake that can lead to unintended weight gain and obesity (Government of Canada, 2018b). Both obesity and high-sugar diets are risk factors for multiple chronic diseases including type 2 diabetes, some cancers, and cardiovascular disease (Di Sebastiano et al., 2020; Government of Canada, 2018b).

Behaviours Related to Sugar-Sweetened Beverage Consumption

Post-secondary students are likely to consume large amounts of SSBs (West et al., 2006). In addition, young adults between the ages of 20 and 39 years of age consume the highest amount of SSBs compared to all other adults (Di Sebastiano et al., 2020). SSBs can be selected based on a variety of factors such as taste, availability, convenience, cost, and perceived health implications. Studies conducted at Canadian and American post-secondaries report that taste is the largest determining factor for beverage choice among students (Kozicky, 2018; Block et al., 2013), followed by availability and convenience (Kozicky, 2018).

Drinking SSBs is associated with negative health behaviours like smoking, inadequate sleep, low physical activity levels, and fast food consumption (Centre for Disease Control and Prevention, 2017). Moreover, students with poor sleeping patterns may consume SSBs to increase their energy levels (Malinauskas, 2007).

Other key factors influencing students' beverage consumption include social and cultural contexts of post-secondary schools, such as partying where SSBs are frequently consumed with alcohol (Malinauskas, 2007). However, with the novel coronavirus pandemic's restrictions on social gatherings and switch to remote learning

(University of British Columbia, n.d.c), these altered post-secondary environments may shift SSB consumption trends. The pandemic itself has also negatively impacted the health and consumption patterns of many individuals due to increased stress, financial restraints, and sedentary lifestyles (Mattioli, 2020). Some people cope with stress by eating unhealthy foods and beverages that are rich in sugar and fat, including SSBs (Mattioli, 2020). Meanwhile, people under tighter budgets may turn to more convenient and energy-dense products like SSBs (Mattioli, 2020).

Unfortunately, young adults between the ages of 18 and 24 are less likely than adults between 25 and 65 years of age to support public health interventions for reducing SSB consumption (Bélanger-Gravel et al., 2019). This may be due to a lack of knowledge on the negative impacts of SSBs on health; thus, increased awareness could potentially increase support for interventions as they will be able to make informed decisions (Bélanger-Gravel et al., 2019).

Mediating Factors

Country of Residence

Country of residence is a relevant factor to consider when assessing mediating factors. UBC's student demographic is a cultural mosaic with representation from over 150 countries (Mukherjee-Reed & Szeri, 2020). In the 2019/2020 academic year, UBC enrolled over 12,000 international undergraduate students and nearly 4,000 international graduate students (Mukherjee-Reed & Szeri, 2020). Overall, almost one-third of UBCV students are international (University of British Columbia, n.d.a), meaning that nearly one-third of UBC students may have a different experience with tap water than that of a Canadian student.

One way that country of residence may influence tap water habits is when individuals come from countries where tap water is not potable. In these instances, they may not be aware that the tap water at UBC is filtered and safe to drink. Additionally, for the 2020/2021 academic year, students were remote learning and permitted to reside outside of Canada (University of British Columbia, n.d.c). Many students may be from a country where tap water is unsafe to drink or where tap water consumption may not be the cultural norm (Di Sebastiano et al., 2020). If tap water consumption is not regular

practice there is potential for students to choose to drink an SSB instead of water, both at home and on-campus, ultimately perpetuating the problem of SSB consumption.

Access and Availability

In addition to concerns regarding tap water availability in other countries, the availability of tap water at UBC is also a mediating factor for SSB consumption. The availability of SSBs and the availability of tap water were both cited by the UBC community as contributing factors for SSB consumption (Kozicky, 2018). In a study of the UBC community's beverage consumption habits, 644 UBC community members, 69% of whom were students, were surveyed (Kozicky, 2018). In this study, it was evident that tap water availability influenced SSB consumption as 20% of individuals claimed that they chose to drink an SSB because there was no tap water available (Kozicky, 2018). Recently, a SEEDS Sustainability Program project surveyed 201 UBC students to gain insight into the perceptions UBC students has regarding tap water, their drinking habit, and barriers to using water fountains (Dha et al., 2020). This student research project found that the largest barrier to fountain usage was locating a fountain (Dha et al., 2020). Through the HBI, UBC aims to increase access to safe drinking water and alter the on-campus landscape to support healthier beverage choices (Di Sebastiano et al., 2020), evidently identifying access as a key factor to increasing tap water consumption and reducing the consumption of SSBs on campus.

The mediating factor of access and availability can also be looked at from the SSB perspective. As mentioned earlier, 20% of individuals from the UBC community chose SSB beverages when no tap water was available (Kozicky, 2018). This tells us not only that there was no tap water available, but also that an SSB was readily available in its place. This implies that both increased tap water access and decreased SSB access should be addressed in interventions and has been seen in the practice in UBC's HBI (Di Sebastiano et al., 2020). One aspect of the HBI intervention was to replace SSBs with healthier options in one of the dining halls on campus (Di Sebastiano et al., 2020). It was found that the removal of SSBs increased purchasing of healthier beverage options (Di Sebastiano et al., 2020), indicating convenience as a mediating factor for SSB purchases among UBC students on campus.

The study done by Kozicky (2018) revealed that people in the UBC community were concerned about the quality of the tap water on campus even though it is thoroughly filtered (University of British Columbia, n.d.b). While students may be simply unaware of the fact that UBC tap water is filtered and safe to drink, it is also likely that advertisements promoting bottled water perpetuate this misinformed belief. These companies insinuate that their product is healthier and purer, even though UBC's tap water is equally safe, pure, and healthy (University of British Columbia, n.d.b). While the study conducted by Dha et al. (2020) found that the majority of students (>60%) disagreed that bottled water was safer than tap water, it was still a common misconception among students. A belief that tap water is less safe than bottled products can result in students choosing to purchase an SSB instead of consuming tap water.

Knowledge and awareness around health risks and implications of high sugar consumption, as well as knowledge and awareness around the amount of sugar present in SSB, have the potential to influence beverage choices as well. The Health Belief Model proposes that individuals are more likely to make a change if they believe that taking action would decrease their susceptibility to, or severity of, a certain condition (National Cancer Institute et al., 2005). Similarly, the Theory of Planned Behaviour suggests that whether an individual perceives a behaviour change as "good" or "bad" will influence their decision to change (National Cancer Institute et al., 2005).

Based on these theories, increasing awareness about the health risks of SSB consumption may decrease SSB consumption in these individuals. At UBC, HBI stakeholders used the strategy of increasing knowledge and awareness to decrease SSB consumption and increase tap water consumption with their tap water promotion campaign (Di Sebastiano et al., 2020). This campaign aimed to maximize student exposure to key messaging which included information regarding the health and safety of UBC tap water as well as the health implications of SSB consumption (Di Sebastiano et al., 2020). A recent study conducted by Gregorio-Pascual and Mahler (2020) found that showing students the amount of sugar in SSBs in equivalent amounts of sugar cubes results in students engaging in more preparatory behaviour to alter their SSB

consumption habits. Therefore, increasing UBC students' awareness of SSBs' negative health consequences may be an effective strategy to reduce SSB consumption.

There are multiple on-campus organizations relevant to this project that function to serve the UBC student community and promote tap water consumption, as well as a healthy campus environment. These organizations include UBC Wellbeing, UBC Food Services, SEEDS, the AMS, and Residence Life. UBC Wellbeing's Food and Nutrition Committee developed the HBI to help students make healthy beverage choices. As part of the initiative, they developed a website, https://h2omg.ca/, to provide students with information to better inform their beverage choices, as well as a wayfinding tool to help students find safe tap water both on campus and throughout Metro Vancouver. Other assets that support the UBC student community in making healthy beverage choices include the water fountains found throughout the campus as well as the healthy beverage choices available at shops and cafes.

Social Ecological Model

Health behaviour theories are useful in planning public health programs because they help us understand people's behaviours, what factors influence these behaviours, and what should be done to change certain behaviours (Hammond, 2021a). This study draws on one of these theoretical frameworks called the Social Ecological Model (SEM) to illustrate the interactions between various levels of influence on an individual's behaviour towards tap water (National Cancer Institute, 2005). The SEM aims to depict how an individual's behaviour is influenced by the social environment and how the social environment is influenced by the individual's behaviour, this is called reciprocal causation (National Cancer Institute, 2005). The SEM outlines the following levels of influence on behaviour change: individual; interpersonal; organizational; and public policy (National Cancer Institute, 2005). Factors within each of these levels can influence an individual's beverage consumption starting from their own beliefs (i.e., individual), to their social networks (i.e., interpersonal), to UBC's campus and restaurants (i.e., organizational/community), and federal recommendations (i.e., public policy). Both reciprocal causation and the multiple levels of influence in the SEM

support this study in promoting tap water consumption among UBC students. The behaviour a student has towards tap water can be influenced by the various levels. Whether a student consumes tap water influences those around them and those around them influence their behaviour.

Recognizing that a multitude of internal and external factors influence beverage consumption, the SEM was used to guide the design of this study and survey. For example, considering the impact of adequate water purification infrastructure with the public policy-level lens helped identify possible barriers to tap water consumption. Consequently, certain survey questions and or the overall study reflects critical considerations to UBC students' tap water consumption, as prompted by the SEM. Moreover, with UBC Wellbeing and UBC Food Services serving as champions for this project and their institutional-level reach, we felt it was appropriate to connect how these departments can effect change in students' health behaviours. A diagram of the SEM in relation to this project can be found in Appendix D.

Limitations

Initial information for our situational assessment was provided to us by our CBEL Community Partner which consisted of websites and articles related to our project. We used various academic search engines, including the UBC Library, Google Scholar, and PubMed, and used key search terms, like *SSB*, *tap water*, and *post-secondary*. We also consulted government-based resources, including Health Canada and Statistics Canada, to find nationally representative information that could support our other findings. Aside from the studies by Di Sebastiano et al. (2020) and Kozicky (2018), other studies that addressed UBC students specifically were created by UBC undergraduates. Methods and reviews of such projects are not subject to the same scrutiny and peer-review processes put in place for professional research projects and papers looking to be accepted into academic journals. Additional studies that looked at the beverage choices of university students were conducted in the United States. The findings from these papers were extrapolated to a Canadian context for this project, though it would have been more relevant if Canadian research was available. Another limitation is that much of the information regarding the health effects of SSB consumption and the overall beverage consumption habits of Canadians was provided

by government websites. While overall this is considered reliable information, these websites sometimes fail to provide the full scope of research methods and context.

Goal & Outcomes

Project Goal

- Advise UBC Food Services and UBC Wellbeing on their tap water campaign based on UBCV students' beverage consumption and perceptions.

Short-Term Objectives (up to 1 year)

I. Obtain at least 50 survey responses from UBCV students by March 15, 2021.
II. Estimate the frequency of tap water and SSB consumption among our sample of UBCV students by March 22, 2021.
III. Identify challenges and opportunities for tap water consumption among UBC students (on- and off-campus) by April 26, 2021.
IV. Inform UBC Food Services and UBC Wellbeing about the UBC student sample's beverage consumption and perceptions by April 26, 2021.
V. Propose the next steps for the UBC Drinks Tap Water to UBC Food Services and UBC Wellbeing by April 26, 2021.

Medium-Term Objectives (from 1-5 years)

I. By 2022, UBC Food Services and UBC Wellbeing will draw on findings from this study to improve the UBC Tap Water Campaign.
II. By 2025, inform UBC program and policy development to increase safe tap water consumption and to reduce sugar-sweetened beverage consumption among UBC students.
III. By 2025, the Food and Nutrition Committee reaching its goal of "achiev[ing] a 50% reduction in sugar-sweetened beverage consumption" at UBC Vancouver (UBC Wellbeing, n.d.)

Long-Term Objectives (More than 5 years)

I.   Over five years from now, UBC will implement new and revised programs and policies (e.g. Wellbeing Framework, Climate Action Plan, Healthy Beverage Initiative) that encourage safe tap water consumption among UBC students.

Project Outputs

Online Qualtrics Survey

Overview

The Tap Water Survey features the following three outputs, also known as activities: survey creation, distribution, then analysis and recommendations. The online survey tool by *Qualtrics* was used to generate the survey that was open to all UBCV students (e.g. undergraduate, graduate, unclassified) from March 4 to 15, 2021. An online format for data collection was chosen for this study since UBC students were mostly off-campus due to the pandemic, so remote data collection allowed for higher participation. The purpose of the study was to gather data on students' tap water and other beverage consumption behaviours and trends. The survey is aligned with the SEM because it helps gain insight into factors that influence an individual's beverage choice, which could be at any level of influence of the SEM.

Design

The survey consisted of 12 questions regarding participants' tap water and other beverage consumption behaviour, and six miscellaneous questions asking if the participants understood the introduction, their level of study, campus, primary country of residence in the 2020-21 academic year, and contact email. Questions were presented as either multiple choice or fill-in-the-blank formats. These questions were generated in consultation with the community partners, drawing inspiration from previous HBI surveys. All survey questions are presented in Appendix E.

The survey first asked participants their country of residence to allow for determination of whether tap water was safe for consumption at their locale, and it would naturally affect their drinking habits. To inquire about the frequency of water consumption, the survey asked "How often do you drink water?" in terms of the number of days per week, and "On days you drink water, how many cups (250 mL) do you

consume on average?" It also asked whether participants usually consumed tap/fountain water, boiled tap water, filtered tap water, or bottled water. If participants did not select "Tap/fountain water," a follow-up question of "What are some reasons you do not drink tap water?" popped up, but received no answers. Participants were asked if they felt that tap water was safe to drink at home and on campus, and this was to ascertain their perception of tap water safety.

The survey also asked about the consumption of other beverages in terms of frequency, in days per month. One question asked about "green" non-problematic beverages such as unsweetened tea and coffee, plant-based milk alternatives, and plain milk. A second one asked about "yellow" drink-only-occasionally types such as lightly-sweetened beverages, diet sodas, and 100% fruit juice. A third asked about "red" try-to-avoid types such as soft drinks, energy drinks, vitamin water, and sports drinks.

The survey asked participants to select the top 3 factors that influenced their drink choices. The factors were taste, cost, nutrition, convenience, habit, social influence, cultural influence, and a fill-in-the-blank if they chose "Other." To ask about trends, participants were asked how their water consumption and SSB consumption have changed (i.e. Increased, unchanged, or decreased) due to the pandemic.

Distribution

The Qualtrics survey link was distributed via several social media platforms, including Facebook, Instagram, and WeChat. Announcements were made during multiple UBC virtual lectures and emails were sent out to UBC students in some FNH courses. Graphics to accompany social media postings were made via the online graphic design platform, Canva. Four $25 gift cards to Loblaw or Save-on-Foods were provided by UBC SEEDS to incentivize participation. The survey was open from March 4th to March 15th, after which data was collected and results were analyzed.

Analysis and Recommendations

There were a total of 182 survey responses collected, which included partial and incomplete entries where a participant did not answer all of the survey questions. Thus, some questions had differing numbers of responses. The lowest response rate was 161, meaning at least 161 participants fully completed the survey. Survey results are

presented in Appendix F. Key findings from the analysis are presented in Appendix G and related recommendations for the tap water campaign are available in Appendix H.

Of 163 responses, 116 students were in the faculty of Land and Food Systems (LFS), 21 in Science, four in Business, 13 in Arts, two in (electrical) Engineering, three in Education, one in Dentistry, two in Forestry, and one in open studies. Of 166 responses, 161 were undergraduates, four were graduates, one was in a professional program, and one responded "Second year," which was corrected for undergraduate. Due to FNH classes being the primary channel in which responses were collected, a large proportion of responses were attributed to LFS. Of 164 responses, 157 respondents resided primarily in Canada in the 2020-21 academic year. For other countries, one resided in the United States of America, one in Portugal, one in Canada/Taiwan, one in Taiwan, one in China, and two in Hong Kong.

Regarding water consumption, the survey asked, "How often do you drink water?" Of 161 responses, 156 answered "every day" while three participants responded "5-6 days per week" and two participants responded "3-4 days per week." The latter five responses were curious, and likely indicate that their thirst was quenched with other beverages.

To determine what form of water participants consumed, the survey asked, "How do you usually consume water?" Of 163 responses, 70 chose tap or fountain water, 45 chose boiled tap water, 43 chose filtered tap water, and five chose bottled water. There was a follow-up question for those who did not answer "tap or fountain water," asking why they did not drink tap water, to which no participant replied. Next, the survey asked (i) "Do you believe tap water is safe to drink at home" and (ii) "Do you believe tap water is safe to drink on campus?" To the first, 147 said yes and 16 said no, for a total of 163 responses. To the second, 125 said yes and 38 said no, meaning that most believe that tap water on campus is safe to drink, but some believe that tap water at UBC is less safe than at home, a perception we know to be untrue. This finding may give insight despite the no-reply to the question of why some respondents did not drink tap or fountain water.

Moving on to other beverages, the survey asked participants about their frequency of consumption in terms of days per month, to which 163 responded. 86 said

they consumed "green" beverages daily (25+ times/month), 38 said every other day (15~20 times/month), 24 said a few times per week (5~10 times/month), 12 said barely at all (1~3 times/month), and three said they never do (0 times/month). Eight said they consumed "yellow" beverages daily, 12 said every other day, 46 said a few times per week, 74 said barely at all, and 23 said they never do. One said they consumed "red" beverages daily, four said every other day, 20 said a few times per week, 77 said barely at all, and 60 said they never do. The survey then asked participants to choose three top factors that influenced their choice of drinks, but the question received a total of 531 inputs, meaning each person made 3.25 choices on average. In descending order of influence was taste (126), nutrition (116), habit (88), convenience (79), cost (72), social influence (27), cultural influence (18), and five named others; they were "caffeine," "0 calories," "post-workout chocolate milk," "alertness," and "to keep my skin complexion healthy and keep me alert throughout the day." In retrospect, it may have been appropriate to list caffeine or energy as a factor.

Lastly, the survey asked about how participants felt about their water-drinking and SSB-consumption behaviour has changed due to COVID-19. To the former, of 163, 64 said it had increased, 82 said unchanged, and 17 said it had decreased. To the latter, 17 said it had increased, 119 said unchanged, and 27 said it had decreased. It seems that for the most part, participants did not gravitate toward SSB consumption, and more people reported positive behaviours increased, compared to the increase in negative behaviours.

Evaluation Plan

We had various modes in which we evaluated, or proposed to evaluate our project's effectiveness. Process indicators were used to assess the inputs and outputs of our program, and outcome indicators were used to assess our program's short-, medium-, and long-term objectives (Hammond, 2021b).

Process Indicators

Beginning with the quantitative indicators, the first was the number of survey channels used. We used five different channels to circulate our survey among UBCV students, including the following: (1) Facebook/WeChat group chats; (2) Canvas class

emails for FNH 473, FNH 371, FNH 455, and FNH 402; (3) Instagram story on team members' accounts; (4) class announcements, including FNH 200 lecture and FNH 473 tutorial; and (5) personal friends of team members. The intent behind this was to collect a diverse range of responses from students of various backgrounds. However, we do recognize that if we had used more channels, we could have achieved this better as the bulk of our respondents (71%) were students enrolled in the LFS faculty. The second quantitative indicator was the number of students who completed the survey. In consultation with our community partners, we determined that a goal of 50 responses was a good target, based on related surveys that were previously conducted for the HBI. We also deemed this goal as realistic, with each group member recruiting around 10 students to participate. However, the survey achieved over three times as much, or 222% higher than our goal as we received 161 responses.

Our qualitative process indicators include the following: (1) whether the survey results were useful for our community partners, and (2) what they gained or learned from our findings. These indicators will allow us to receive feedback on our work and gain well-rounded insights into the strengths and limitations of our findings from the perspectives of our community partners; we anticipate feedback after April 14, 2021, upon submission of our report.

Outcome Indicators

We have proposed two indicators to assess the impact of our program, which reflect our long-term objectives. The first is whether our findings were incorporated into future interventions for promoting tap water consumption and reducing SSB consumption among UBC students. The second indicator is whether our findings were useful for reaching UBC Wellbeing's goal of "achiev[ing] a 50% reduction in [SSB] consumption" at UBCV (UBC Wellbeing, n.d.). To determine this, we must monitor UBC Wellbeing's progress over the years, as well as whether or not our findings supported their progress.

Survey Limitations

There are several limitations to the design and distribution of our survey, thereby limiting the extent to which our findings can effectively be implemented into future

interventions. First, our survey was not representative of the UBCV population as there was a disproportionate number of students from each faculty who completed our survey, with 71% of respondents enrolled in programs within the LFS faculty. Second, recall bias may have affected the results; those who did not accurately recall their beverage consumption habits, as well as the specific amounts they consumed, may have misreported their answers. Third, it is possible that respondents were dishonest in their responses to appear 'healthier', especially since their identities may not have been anonymous if they chose to enter their email to enter the draw. Additionally, those who rushed through the survey and gave arbitrary responses may have skewed the results; as most questions were multiple-choice, there is a higher likelihood that some respondents chose answers by random. Lastly, our survey asked respondents to report their primary country of residence throughout the academic year, failing to capture those who travelled throughout the year and whose beverage consumption patterns were dependent on the region in which they resided. To keep the survey short and quick for convenience purposes and to achieve a high response rate, we had to compromise the depth of the survey.

Conclusion

The Tap Water Study aimed to increase UBC Food Services and UBC Wellbeing's understanding of UBCV students' beverage consumption and perceptions. The data collected through an online survey to the target audience of UBCV students is intended to inform the direction of their Tap Water Campaign.

Key lessons were learned through the survey data and project planning process. From the survey, we found that most respondents drink water every day, and mostly from taps or fountains. As for the respondents' perceptions of tap water safety, 10% of the sampled students do not believe their tap water is safe to consume at home and even more (23%) do not believe the water at UBC Vancouver is safe to drink. Consistent with the literature on beverage choice factors among post-secondary students, taste and nutrition were among the top reported determinants. Through the planning process of the survey, we learned the value of drawing from health behaviour theories like the SEM in prompting us to recognize various factors that may influence

the beverage consumption of UBC students. In the case of this project with community partners at the institutional level of the SEM, this helped visualize the interrelation of organizations like UBC Food Services and UBC Wellbeing with UBC students.

By leveraging the Logic Model framework as guidance, all process indicators corresponding to our short-term objectives were met. That is, the following were achieved by their deadlines; obtained over 50 survey responses; estimated the frequency of tap water and SSB consumption among the survey sample; identified challenges and opportunities to tap water consumption; informed the community partners of the survey findings; and proposed next steps for the tap water campaign.

As for our medium- and long-term objectives that are designed to be met by 2022 or later, they are not yet ready for evaluation using their respective process or outcome indicators. Among the recommended next steps for UBC Food Services and UBC Wellbeing to encourage these objectives, is to review this report, particularly Appendices G and H and consider integrating this information for their Tap Water Campaign. Additionally, sharing the study's findings with other UBC groups involved in related projects may help with the long-term objective of this project shaping UBC policies regarding beverage consumption of UBC students.

Authors' Contributions

Sara functioned as our community partner liaison and was responsible for emailing and contacting our community partners when needed. As a group, we drafted outlines for our meetings before meeting with our community partners. During the meetings, all group members interacted with the community partners, but Sara was primarily responsible for working through our questions and meeting schedule. Krista, Negar, and Dorothy took notes during meetings to be referred to later.

The Table of Contents was done by Sara. The Executive Summary was written by Krista and the Introduction was written by Sara and Benson.

The situational assessment was divided into four parts - problem, behaviours, mediating factors, and planning framework. Krista researched and wrote the problem and mediating factors sections, while Negar researched and wrote the behaviours section. Krista and Negar edited and revised each other's parts for these sections of the

situational assessment. Together, Krista and Negar wrote the relevant assets section as well as the limitations of the situational assessment. Dorothy wrote the planning framework section of the situational assessment titled Social Ecological Model, and Sara contributed to this section with edits and revisions.

Everyone contributed to the development of the project goal as well as the short, medium, and long-term outcomes. Sara revised and edited this section to incorporate feedback and finalized them for the report. The Project Outputs was written by Dorothy and Benson, with the survey structure, content and delivery by Dorothy and the survey results by Benson. The initial draft of the survey questions was done by Krista and Dorothy, and everyone on the team worked together to incorporate feedback and edit the final version. The final survey questions were summarized in Appendix E by Dorothy and Sara. Benson transferred the survey into the online platform, Qualtrics, and was responsible for the survey analysis and results, as seen in the Outputs section and Appendix F. Reformatting of the data presented in Appendix F was undertaken by Sara and Benson.

The Evaluation Plan, consisting of process indicators, outcome indicators, and survey limitations, was written by Negar. The Conclusion was written by Sara and the Author's Contributions section was written by Krista. Everyone contributed to the Logic Model visual seen in Appendix A, then Krista and Negar did the write-up for this section of the report. Sara wrote the Newsletter for our community partners (Appendix B), while Krista and Negar edited it. Dorothy was responsible for final edits and creating the document outlined in Appendix B on the online platform, Canva. Sara created the stakeholder overview diagram seen in Appendix C.
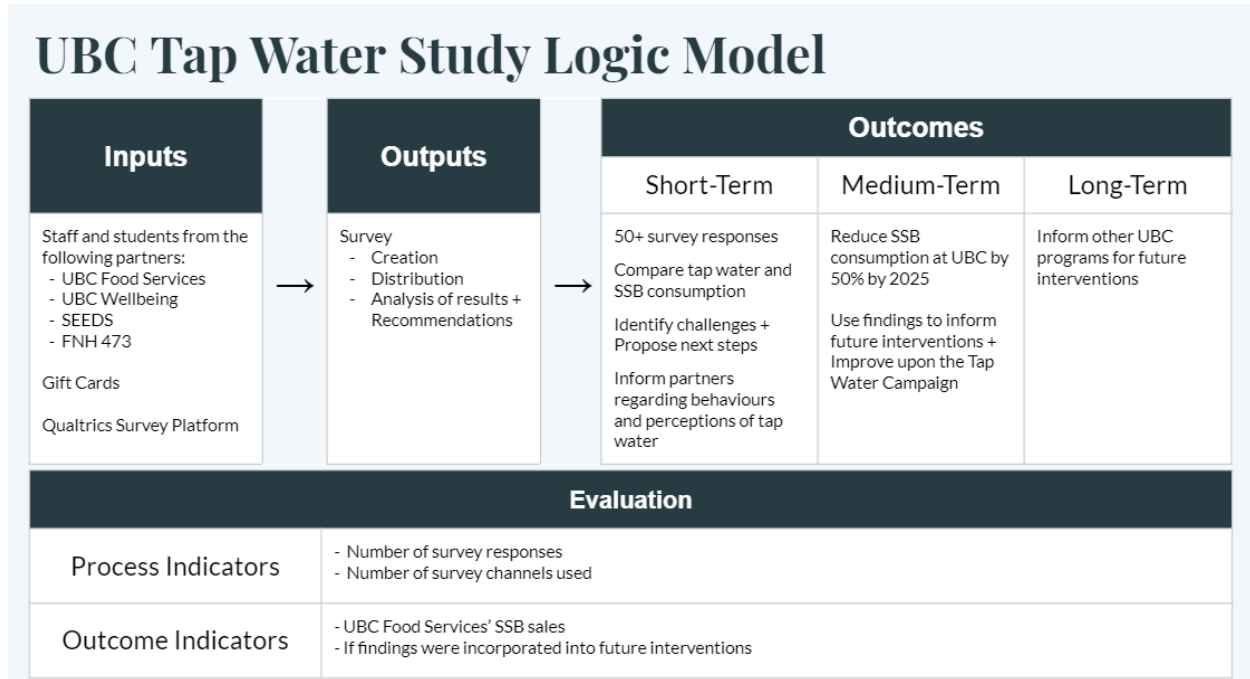
References

Bélanger-Gravel, A., Desroches, S., Janezic, I., Paquette, M. C., & De Wals, P. (2019). Pattern and correlates of public support for public health interventions to reduce the consumption of sugar-sweetened beverages. *Public Health Nutrition, 22*(17), 3270–3280. https://doi.org/10.1017/S1368980019002076

Block, J. P., Gillman, M. W., Linakis, S. K., & Goldman, R. E. (2013). "If it tastes good, I'm drinking it": qualitative study of beverage consumption among college students. *Journal of Adolescent Health 52*(6), 702–706. https://doi.org/10.1016/j.jadohealth.2012.11.017

Centers for Disease Control and Prevention. (2017). *Get the Facts: Sugar-Sweetened Beverages and Consumption*. Retrieved March 14, 2021, from https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html

Dha, N., Hui, N., Yu, O., & Li, A., (2020). The Good, The Bad, and The Ugly : Assessing Indoor Water Fountains on the UBC Campus: final report. https://open.library.ubc.ca/cIRcle/collections/undergraduateresearch/18861/items/1.0392733

Di Sebastiano K.M., Kozicky, S., Baker, M., Dolf, M., & Faulkner (2020). The University of British Columbia healthy beverage initiative: chaining the beverage landscape on a large post-secondary campus. *Public Health Nutrition*. doi:10.1017/S1368980020003316

Garriguet, D. (2019). Changes in beverage consumption in Canada. *Health Reports, 30*(7), 20-30.https://www-doi-org.ezproxy.library.ubc.ca/10.25318/82-003-x201900700003-eng

Government of Canada (2018a). Sugars. Retrieved February 25, 2021, from https://www.canada.ca/en/health-canada/services/nutrients/sugars.html

Government of Canada (2018b). Canadian Drinking Water Guidelines. Retrieved February 25, 2021, from https://www.canada.ca/en/health-canada/services/environmental-workplace-healt

h/water-quality/drinking-water/canadian-drinking-water-guidelines.html?=undefine
d&#shr-pg0

Gregorio-Pascual, P. & Mahler, H., (2020). Effects of interventions based on the theory
of planned behaviour on sugar-sweetened beverage consumption intention and
behaviours. *Appetite,* 145. https://doi.org/10.1016/j.appet.2019.104491

Hammond, G. (2021a). *FNH 473 - Week 3 notes.* [Lecture notes]. Canvas UBC.
https://canvas.ubc.ca/courses/59879/files/12522931?wrap=1

Hammond, G. (2021b). *FNH 473 - Week 5 notes.* [Lecture notes]. Canvas UBC.
https://canvas.ubc.ca

Kozicky, S. (2018). *A Healthy Beverage Initiative - University of British Columbia
Campus Engagement.* University of British Columbia.
https://sustain.ubc.ca/sites/default/files/2018-01%20A%20Healthy%20Beverage
%20Initiative%20UBC%20Campus%20Engagement_Kozicky.pdf

Malinauskas, B. M., Aeby, V. G., Overton, R. F., Carpenter-Aeby, T., & Barber-Heidal, K.
(2007). A survey of energy drink consumption patterns among college students.
Nutrition Journal, 6, 35. https://doi.org/10.1186/1475-2891-6-35

Mattioli, A. V., Sciomer, S., Cocchi, C., Maffei, S., & Gallina, S. (2020). Quarantine
during COVID-19 outbreak: Changes in diet and physical activity increase the
risk of cardiovascular disease. *Nutrition, Metabolism and Cardiovascular
Diseases, 30*(9), 1409-1417.

National Cancer Institute, US Department of Health and Human Services, National
Institute of Health (2005). *Theory at a Glance - A Guide For Health Promotion
Practice* (2nd edition).

Sadowski, R. & Willock, A. (2010). Shifting to Sustainable Drinking Water Consumption
At UBC: A Social Marketing Plan [R]. http://dx.doi.org/10.14288/1.0108304

Mukherjee-Reed, A., & Szeri A. (2020). *Enrolment Annual Report 2019-2020.* University
of British Columia.
https://bog3.sites.olt.ubc.ca/files/2020/07/4_2020.02_Enrolment-Annual-Report.p
df

University of British Columbia. (n.d.a). *UBC Overview and Facts 2019-2020.* Retrieved
March 21, 2021 from: https://www.ubc.ca/about/facts.html

University of British Columbia. (n.d.b). *UBC Drinks Tap Water.* Retrieved March 21,
2021 from: https://h2omg.ca/

University of British Columbia. (n.d.c). *Coronavirus (COVID-19) and UBC's response.*
Retrieved April 10, 2021 from: https://covid19.ubc.ca/

UBC Wellbeing. (n.d.a). *Healthy Beverage Initiative*. Retrieved from the University of
British Columbia on March 21, 2021:
https://wellbeing.ubc.ca/healthy-beverage-initiative-0

UBC Wellbeing. (n.d.b). *A Healthy Beverage Initiative at UBC*. Retrieved from the
University of British Columbia on March 21, 2021:
https://wellbeing.ubc.ca/sites/wellbeing.ubc.ca/files/u9/HBI%20background_UBC.
pdf

UBC Wellbeing. (n.d.c). *UBC Wellbeing Annual Report 2019-20.* University of British
Columbia. https://wellbeing.ubc.ca/annualreport19-20

Vartanian, L.R., Schwartz, M.B., & Brownell, K.D. (2007). Effects of Soft Drink
Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis.
American Journal of Public Health, 97, 667-675.
https://doi.org/10.2105/AJPH.2005.083782

West, D. S., Bursac, Z., Quimby, D., Prewitt, T. E., Spatz, T., Nash, C., Mays, G., &
Eddings, K. (2006). Self‑reported sugar‑sweetened beverage intake among
college students. *Obesity, 14*(10), 1825-1831.

Appendix A: Logic Model

UBC Tap Water Study Logic Model

Inputs	Outputs	Outcomes		
		Short-Term	**Medium-Term**	**Long-Term**
Staff and students from the following partners: - UBC Food Services - UBC Wellbeing - SEEDS - FNH 473 Gift Cards Qualtrics Survey Platform	Survey - Creation - Distribution - Analysis of results + Recommendations	50+ survey responses Compare tap water and SSB consumption Identify challenges + Propose next steps Inform partners regarding behaviours and perceptions of tap water	Reduce SSB consumption at UBC by 50% by 2025 Use findings to inform future interventions + Improve upon the Tap Water Campaign	Inform other UBC programs for future interventions

Evaluation	
Process Indicators	- Number of survey responses - Number of survey channels used
Outcome Indicators	- UBC Food Services' SSB sales - If findings were incorporated into future interventions

Inputs

Inputs include staff from UBC Food Services, UBC Wellbeings, and UBC SEEDS, as well as FNH 473 students and staff. UBC Food Services is the main community partner contact for the Tap Water Study. The primary contact was Melissa Baker-Wilson, the Manager of Nutrition and Well-being, and the co-chair for UBC Wellbeing's Food and Nutrition Committee. This project is also supported by UBC SEEDS. From here, the primary contact is Project Coordinator, Joshua Azza. The FNH 473 group served as the core project leads who planned and executed the tap water study with guidance and approval from Melissa and Josh. The FNH teaching team functioned as peripheral support during this project. Each of these groups contributed time and resources in the form of staff or students. Additionally, UBC Qualtrics was used for the survey and UBC SEEDS contributed financial incentives for the survey participants in the form of grocery store gift cards. An organizational chart summarizing these stakeholders are presented in Appendix C.

Outputs

The Tap Water Study involved three main project outputs, also referred to as activities. These outputs are the design, distribution, analysis of the online Qualtrics survey on UBCV students' beverage consumption and perceptions.

Outcomes

As presented in the Goal & Outcomes section, this project identified five short-term objectives, three medium-term objectives, and one long-term objective.

Evaluation

Process Indicators

Quantitative indicators include the number of survey channels used and the number of survey responses received. Qualitative indicators include whether the survey results were useful for our community partners and whether they gained knowledge from our findings.

Outcome Indicators

We had two indicators of whether the findings were used in future interventions as well as whether the findings helped UBC Wellbeing achieve their goal of reducing SSB consumption by 50% on the UBCV campus.

Appendix B: Brief for Community Partner

UBC Tap Water Study

A SEEDS Sustainability Program and Community-Based Experiential Learning Project

Project Overview

The Tap Water Study was undertaken by UBC Food Services, UBC Wellbeing, and FNH 473 students with support of UBC SEEDS . Through a survey of UBC students, the FNH 473 group aimed to advise their community partners on students' beverage consumption and perceptions. UBC Food Services and UBC Wellbeing anticipate using the study's findings to inform their tap water campaign, UBC Drinks Tap Water. The community liaisons, Melissa and Joshua, provided invaluable guidance and resources throughout the study. Partnering with well-established UBC departments provided a wealth of knowledge regarding the initiative and target population. The group appreciates being introduced to these resources early on, allowing them to work more efficiently and effectively.
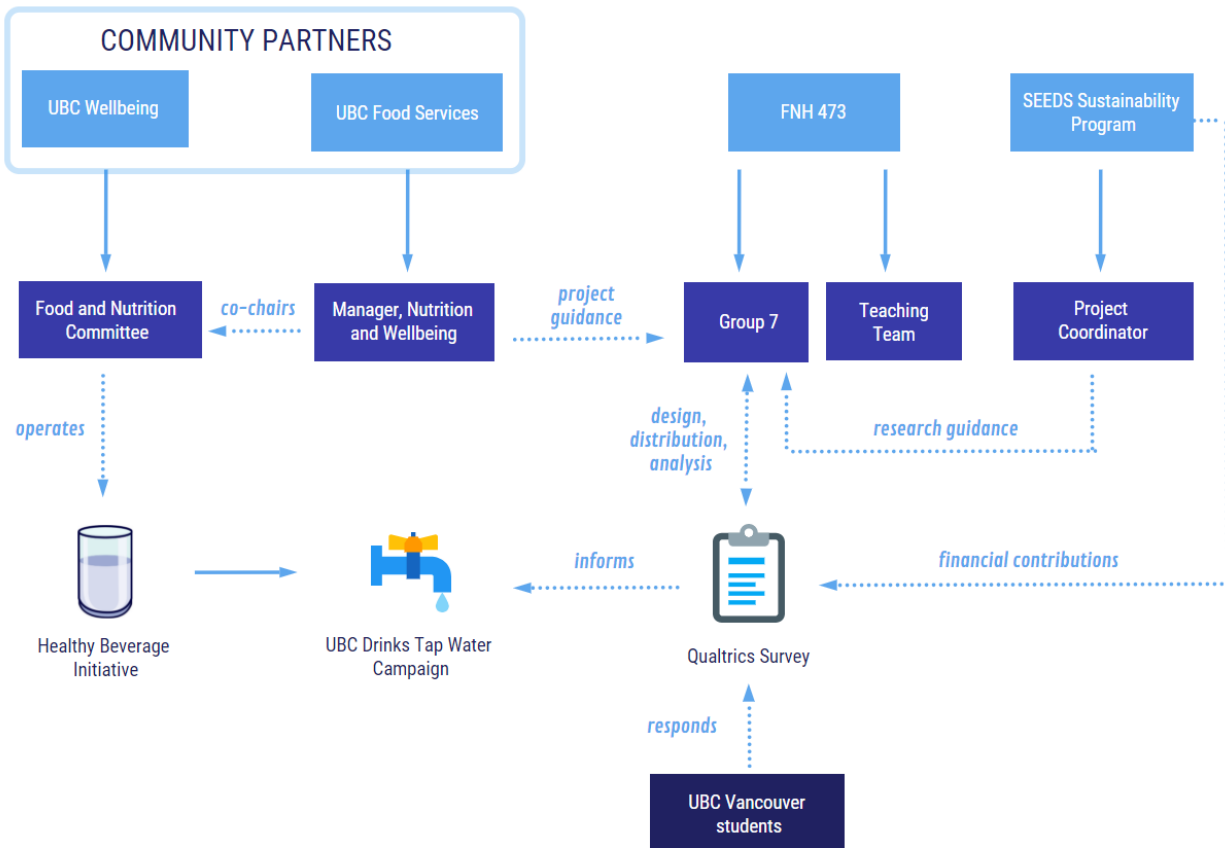
Lessons Learned

Through this study, the students were reminded of how fortunate they were to have access to safe tap water. In planning this project, they learned that not every UBC student had access to potable water at home, and this can translate into misinformation or hesitancy towards UBC's tap water. While the FNH 473 group believed UBC's water to be safe, they realized that not everyone shared this belief. A notable finding from the survey was that around 10% of respondents did not believe they had access to safe tap water at home and around 23% did not believe the UBC Vancouver campus had safe tap water.
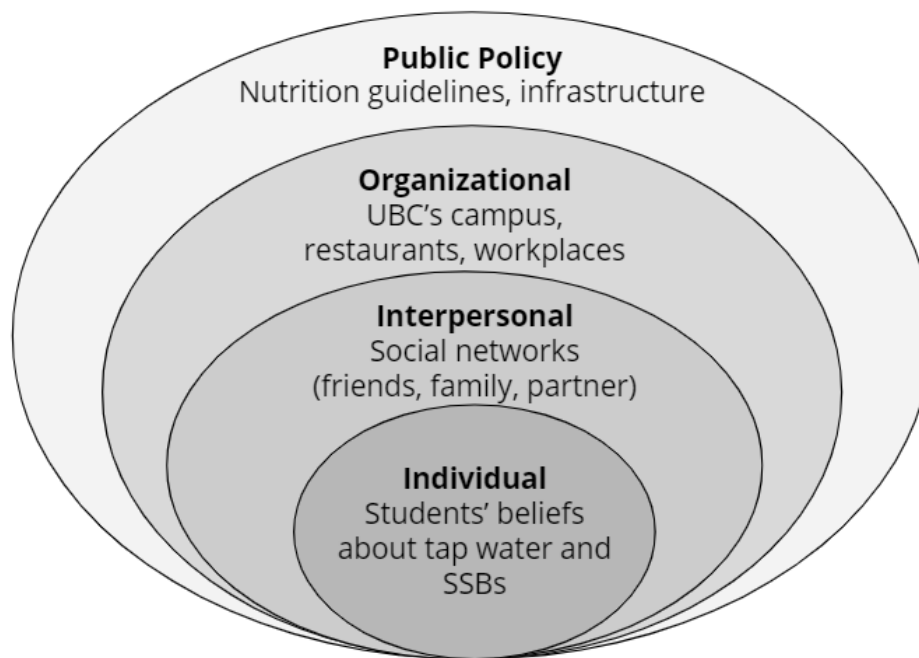
Public Health Experiential Learning

As a community-based experiential learning (CBEL) project, the students applied FNH 473 coursework within their UBC community. For many of them, this was their first time engaging in public health nutrition and a CBEL project, so they appreciated the opportunity to work with a familiar context. As UBC students themselves, it was easier to design and deliver an online survey that could reach and engage students. Meanwhile, Melissa and Joshua's expertise ensured the survey could provide valuable data for the Tap Water Campaign. This collaboration drew on everyone's unique assets and demonstrated the value of having diverse individuals working on public health programming.

Appendix C: Stakeholder Overview

Appendix D: Social Ecological Model

Public Policy
Nutrition guidelines, infrastructure

Organizational
UBC's campus,
restaurants, workplaces

Interpersonal
Social networks
(friends, family, partner)

Individual
Students' beliefs
about tap water and
SSBs

Appendix E: Survey Questions

1. **Which school do you attend?** [Multiple Choice Format]
   a. UBC Vancouver
   b. UBC Okanagan
   c. Neither
2. **What is your current level of study?** [Multiple Choice Format]
   a. Undergraduate
   b. Graduate
   c. Post-Graduate
   d. Unclassified
   e. Other: [Fill in blank]
3. **In which faculty/program do you study?** [Typed Response Format]
4. **For the 2020/2021 academic year, which country do you primarily reside?** [Typed Response Format]
5. **How often do you drink water? (days/week)** [Multiple Choice Format]
   a. 0
   b. 1-2
   c. 3-4
   d. 5-6
   e. Everyday
6. **On days you drink water, how many cups do you consume on average?** [Typed Response Format]
7. **How do you usually consume water?** [Multiple Choice Format]
   a. I don't usually drink water
   b. Tap or fountain water
   c. Boiled tap water
   d. Filtered tap water
   e. Bottled water
8. **Do you believe tap water is safe to drink at home?** [Yes or No Format]
9. **Do you believe tap water is safe to drink on campus?** [Yes or No Format]
10. **How often do you consume drinks such as unsweetened tea, coffee, plant-based milk alternatives, and plain milk? (times/month)** [Multiple Choice Format]
    a. 0 (Never)
    b. 1-3 (Rarely)
    c. 5-10 (Sometimes)
    d. 15-20 (Often)
    e. 25+ (Daily)
11. **How often do you consume lightly sweetened beverages such as unsweetened diet (0 calorie) sodas, sugary drinks with naturally-occurring**

ingredients, 100% fruit juices? (times/month) [Multiple Choice Format]
- a. 0 (Never)
- b. 1-3 (Rarely)
- c. 5-10 (Sometimes)
- d. 15-20 (Often)
- e. 25+ (Daily)

12. **How often do you consume sugar-sweetened beverages without naturally-occurring ingredients (e.g., soft drinks, non-100% fruit juices, energy drinks)? (times/month)** [Multiple Choice Format]
- a. 0 (Never)
- b. 1-3 (Rarely)
- c. 5-10 (Sometimes)
- d. 15-20 (Often)
- e. 25+ (Daily)

13. **What are the main factors that impact your drink choices? Select your top 3.** [Checkbox Format]
- a. Taste
- b. Cost
- c. Nutrition
- d. Convenience
- e. Habit
- f. Social Influence
- g. Cultural Influence
- h. Other: [fill in blank]

14. **How do you think your water-drinking behaviour has changed due to COVID-19?** [Multiple Choice Format]
- a. Increased
- b. Unchanged
- c. Decrease

15. **How do you think your sugar-sweetened beverage consumption has changed due to COVID-19?** [Multiple Choice Format]
- a. Increased
- b. Unchanged
- c. Decreased

Appendix F: Survey Results

1. **Which school do you attend?** [Multiple Choice Format]
   Number of Responses = 177
   a. UBC Vancouver (175)
   b. UBC Okanagan (1)
   c. Neither (1)

2. **What is your current level of study?** [Multiple Choice Format]
   Number of Responses = 166
   a. Undergraduate (160)
   b. Graduate (4)
   c. Post-Graduate
   d. Unclassified
   e. Other: professional program (1)
   f. Other: second year (1)

3. **In which faculty/program do you study?** [Typed Response Format]
   Number of Responses = 163
   a. Faculty of Land and Food Systems (17)
      i. Food, Nutrition and Health (55)
      ii. Dietetics (24)
      iii. Food Science (5)
      iv. Nutritional Science (11)
      v. Food and Resource Economics (1)
      vi. FNH + Education 1
      vii. Food Market Analysis 1
      viii. Global Resource Systems 1
   b. Faculty of Science (2)
      i. Statistics (1)
      ii. Biology (3)
      iii. Microbiology and Immunology (2)
      iv. CAPS (1)
      v. Applied Science
         1. CPEN (1)
         2. Environmental Design (1)
      vi. Integrated Science (5)
      vii. Masters in Math (1)
      viii. Pharmacy (3)
      ix. Behavioural Neuroscience (1)
   c. Sauder School of Business 1
      i. Commerce (2)

   ii. Finance (1)
 d. Faculty of Arts (7)
   i. Psychology (1)
   ii. Geography (2)
   iii. GSRJ (1)
   iv. International Relations (2)
 e. Faculty of Engineering
   i. Electrical (2)
 f. Faculty of Education
   i. Masters in Adult Learning and Education (1)
   ii. Kinesiology (2)
 g. Faculty of Dentistry (1)
 h. Faculty of Forestry
   i. Natural Resource Conservation (2)
 i. Open Studies (1)

4. **For the 2020/2021 academic year, which country do you primarily reside?**
   [Typed Response Format]
   Number of Responses = 164
   a. Canada (157)
   b. US (1)
   c. Portugal (1)
   d. Canada/Taiwan (1)
   e. Taiwan (1)
   f. China (1)
   g. Hong Kong (2)

5. **How often do you drink water? (days/week)** [Multiple Choice Format]
   Number of Responses = 161
   a. 0 (0)
   b. 1-2 (0)
   c. 3-4 (2)
   d. 5-6 (3)
   e. Everyday (156)

6. **On days you drink water, how many cups do you consume on average? (cups/day)** [Typed Response Format]
   Number of responses = 162
   - 1 (2)
       - 1~2 (3)
       - 1.5 (1)
   - 2 (6)

- 1~3 (1)
  - 2~3 (3)
- 3 (12)
  - 3~4 (3)
- 4 (24)
  - 4.5 (1)
  - 4~5 (7)
  - 3~5 (1)
- 5 (9)
  - 5~6 (3)
  - 4~6 (2)
- 6 (21)
  - 5~7 (1)
  - 6~7 (2)
  - 6.5 (1)
- 7 (7)
  - 6~8 (3)
  - 7~8 (4)
- 8 (18)
  - 6~10 (2)
- 9 (4)
  - 8~10 (6)
- 10 (8)
- 10~12 (1)
- 12 (3)
- 14 (1)
- 20 (1)
- Not sure (1)

7. **How do you usually consume water?** [Multiple Choice Format]
   Number of responses = 163
   a. I don't usually drink water (0)
   b. Tap or fountain water (70)
   c. Boiled tap water (45)
   d. Filtered tap water (43)
   e. Bottled water (5)

8. **Do you believe tap water is safe to drink at home?** [Yes or No Format]
   Number of responses = 163
   a. Yes (147)
   b. No (16)

9. **Do you believe tap water is safe to drink on campus?** [Yes or No Format]
   Number of responses = 163
     a. Yes (125)
     b. No (38)

10. **How often do you consume drinks such as unsweetened tea, coffee, plant-based milk alternatives, and plain milk? (times/month)** [Multiple Choice Format]
    Number of responses = 163
      a. 0 (Never) (3)
      b. 1-3 (Rarely) (12)
      c. 5-10 (Sometimes) (24)
      d. 15-20 (Often) (38)
      e. 25+ (Daily) (86)

11. **How often do you consume lightly sweetened beverages such as unsweetened diet (0 calorie) sodas, sugary drinks with naturally-occurring ingredients, 100% fruit juices? (times/month)** [Multiple Choice Format]
    Number of responses = 163
      a. 0 (Never) (23)
      b. 1-3 (Rarely) (74)
      c. 5-10 (Sometimes) (46)
      d. 15-20 (Often) (12)
      e. 25+ (Daily) (8)

12. **How often do you consume sugar-sweetened beverages without naturally-occurring ingredients (e.g., soft drinks, non-100% fruit juices, energy drinks)? (times/month)** [Multiple Choice Format]
    Number of responses = 162
      a. 0 (Never) (60)
      b. 1-3 (Rarely) (77)
      c. 5-10 (Sometimes) (20)
      d. 15-20 (Often) (4)
      e. 25+ (Daily) (1)

13. **What are the main factors that impact your drink choices? Select your top 3.** [Checkbox Format]
    Number of responses = 531
      a. Taste (126)
      b. Cost (72)
      c. Nutrition (117)
      d. Convenience (79)

e. Habit (88)
f. Social Influence (27)
g. Cultural Influence (18)
h. Other: [fill in blank] (5)
    i. Caffeine (1)
    ii. 0 calories → +1 Nutrition
    iii. Chocolate milk after I work out in the morning (1)
    iv. Alertness (1)
    v. To keep my skin complexion healthy and to make me feel less tired throughout the day (1)

14. **How do you think your water-drinking behaviour has changed due to COVID-19?** [Multiple Choice Format]
    Number of responses = 163
    a. Increased (64)
    b. Unchanged (82)
    c. Decrease (17)

15. **How do you think your sugar-sweetened beverage consumption has changed due to COVID-19?** [Multiple Choice Format]
    Number of responses = 163
    a. Increased (17)
    b. Unchanged (119)
    c. Decreased (27)

Appendix G: Key Findings

Country of Residence

CANADA
Approximately 96% of respondents

UNITED STATES
Less than 1% of respondents

PORTUGAL
Less than 1% of respondents

CHINA, HONG KONG, TAIWAN
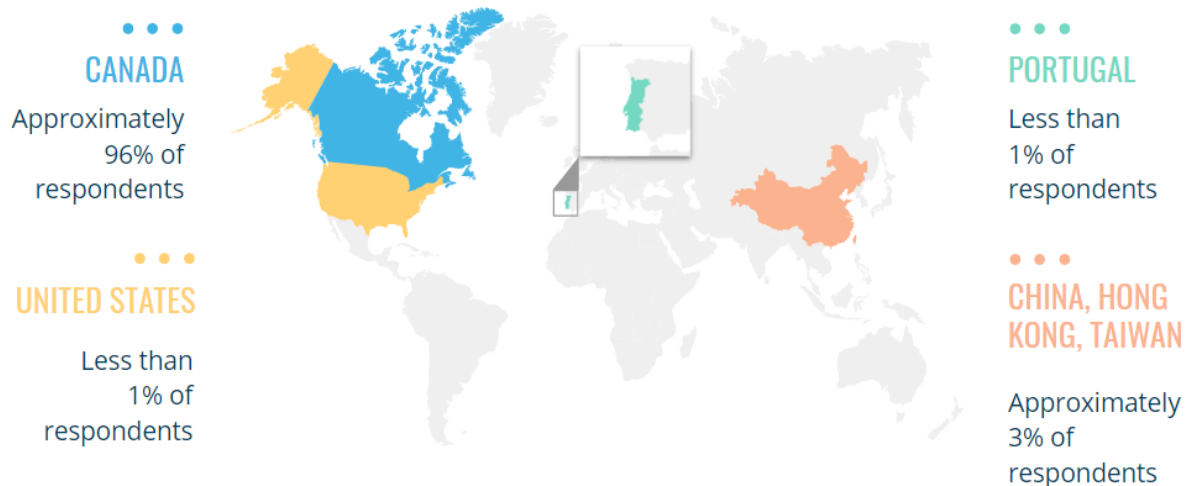Approximately 3% of respondents

Figure 1. Primary Country of Residence for 2020/2021 Academic Year.

In response to question 4 of the survey, the majority (96%) of respondents reported primarily residing in Canada for this academic year. According to the UBC Annual Enrolment Report from the 2019/2020 academic year, one third of UBC students were international students, and while we cannot make any definitive assumptions using our data, it is interesting to note that only a minor population (4%) reside in countries outside of Canada. While it would be beneficial to know the specific regions in which respondents reside, it is important to note that these are all middle-high income countries, suggesting that the likelihood of our respondents lacking access to safe tap water is not as high.
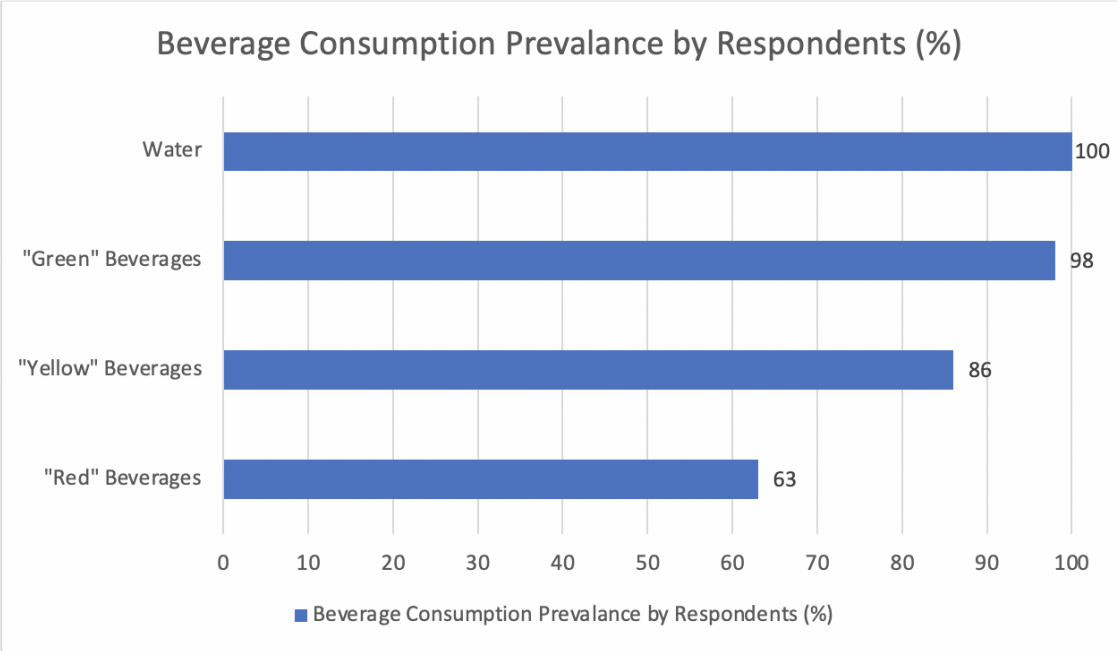
SSB Consumption

Figure 2. Using UBC Wellbeing's traffic light system to group beverages, we have reported the prevalence of monthly beverage consumption across green, yellow, and red beverages, as well as water. On a monthly basis, 100% of respondents drink water, 98% of respondents drink green beverages, 86% of respondents drink yellow beverages, and 63% of respondents drink red beverages. We are pleased to see that all respondents consume water; however, the high prevalence of red beverage consumption should be addressed and reduced. Details of the traffic light system are highlighted in our report on page 13 under *Survey Design*.

Water Consumption and Perception

Proportion of Water Consumption by Respondents (%)

Category	Value
Bottled	3
Filtered Tap	26
Boiled Tap	28
Regular Tap	43

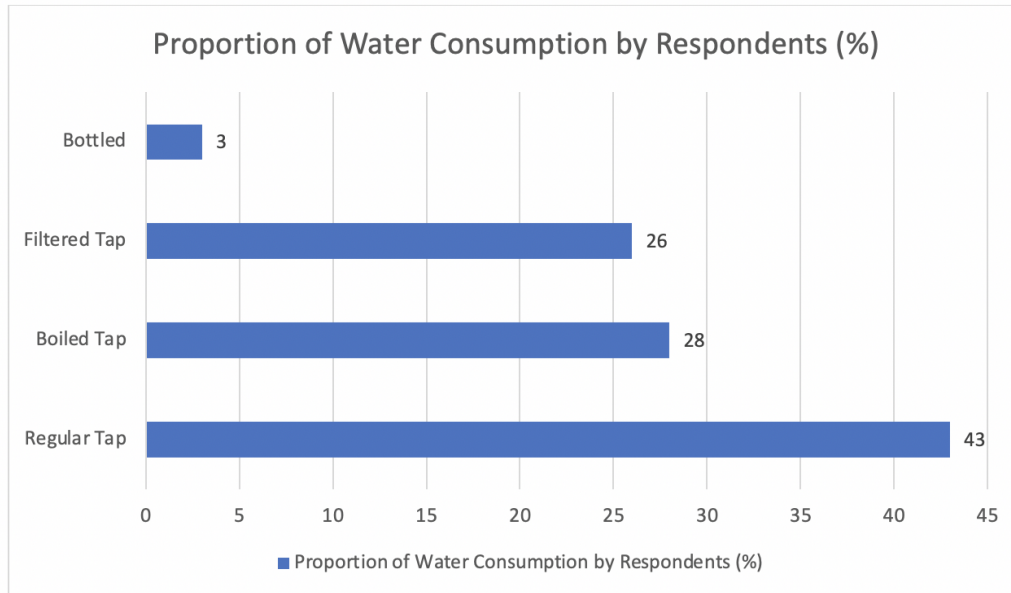■ Proportion of Water Consumption by Respondents (%)

Figure 3. Out of 163 respondents, 43% (n=70) drink tap and/or fountain water, 28% (n=45) drink boiled tap water, 26% (n=43) drink filtered tap water, and 3% (n=5) drink bottled water. While we are pleased to see that only 3% of students mainly drink bottled water, the proportion of students who mainly drink boiled tap water is surprisingly high. This could be due to various reasons, including the idea that tap water is not safe for consumption, which around 10% (n=16) and 23% (n=38) believe that tap water is not safe at home and on-campus, respectively.

Appendix H: Recommendations for UBC Drinks Tap Water

Recommendation 1: Investigate why students perceive tap water as unsafe at home and at UBCV.

Some UBCV students continue to perceive tap water as unsafe. Among the Tap Water Study respondents, 10% do not believe tap water is safe to consume at home and 23% do not believe tap water is safe on campus. Yet interestingly, no respondents cited water advisories as barriers to tap water consumption. Consequently, further research into why students perceive tap water as unsafe, if not for actual water advisories, is warranted. Subsequent findings should be integrated into the tap water campaign to bridge this knowledge gap.

Recommendation 2: Increase the reach of educational materials regarding tap water safety at UBCV.

The fact that 23% of respondents do not believe campus tap water is safe to drink suggests that nearly a quarter of UBC students are not being reached by the educational and promotional material created by the HBI and the related UBC Drinks Tap Water campaign. Future action should include finding ways for educational material to reach more students. This may include increasing promotional material posted around campus, or finding ways to drive more students to the HBI websites that educate students on the safety of campus tap water.

Recommendation 3: Focus on promoting the taste and nutrition of tap water over SSBs.

Survey respondents commonly identified taste and nutrition as the main factors considered when selecting drinks. These factors are followed by habit, convenience and cost. These factors should continue to remain focal points of the Tap Water campaign by educating UBCV students on the nutritional benefits of tap water consumption for effective behaviour change communication. Additionally, because taste was ranked as the number one factor for beverage choices, UBC should ensure that the taste of the tap water provided on campus is up to student standards. Future investigation could include gaining further insight on student perceptions regarding the taste quality of campus tap water, as poor taste would likely contribute to fewer students choosing to drink tap water.

Recommendation 4: Investigate why students are boiling their tap water.

Our survey found that 28% of respondents boiled their tap water instead of drinking it straight from the tap. Future projects may find it useful to investigate this

further to determine why this number was so high. Reasons for this may include cultural differences, mis-trust in the safety of tap water, or a misunderstanding of the question. For example, survey respondents may have thought this question included boiled water beverages, such as black coffee or tea, even though the question was not meant for these beverages to be included as answers. Additionally, we are aware that some UBCV students' households boil tap water in hot water dispensers and then allow the water to cool before consuming, likely due to habit or cultural reasons. This could have led to increased responses for boiled tap water for this question. It may be beneficial for future investigations to look into why students are boiling their tap water and/or filtering it before consumption, as this may give insight into barriers for tap water consumption. Similar investigations into why students consume bottled water may also be of interest as the HBI aims to promote bottle water only when safe tap water is unavailable (UBC Wellbeing, n.d.b).