Understanding the impact on household food waste and packaging reduction through the use of a direct to consumer meal kit model

* * * * *

A comparison between HelloFresh meal kits and meals prepared from scratch with grocery bought ingredients

March 27, 2019

Executive Summary

The purpose of the study conducted by Value Chain Management International (VCMI) for HelloFresh Canada was to quantify the impact on household food waste through the use of a direct-to-consumer meal kit model compared to food waste resulting from consumers having purchased raw ingredients from grocery stores before preparing similar meals from scratch. The study, conducted in March 2019, took place within the Greater Toronto Area (GTA). The research also sought to quantify indicatively the impact of meal kits on food packing waste in the GTA at a micro household level.

Sixteen households (8 x 2-person households and 8 x 4-person households) participated in the research. The households were divided equally between urban and suburban locations. Each household prepared three evening meals a week for two weeks (over a three-week period). For one week, respondent households weighed preparation and plate waste resulting from the cooking of food ingredients contained in HelloFresh meal kits, and recorded the results. The next week respondent households weighed preparation and plate waste resulting from the cooking of food ingredients purchased at grocery stores, and recorded the results. This produced data on 96 meal occasions, equating to a total of 288 individual meals. Each household then participated in a debrief telephone call, during which they were asked to share insights and their overall experience of participating in the study.

Data recorded by participating households was entered into Minitab for one and two-way "Analysis of Variance" (ANOVA) and other statistical analysis. Headline findings produced by the overall analysis, most of which are statistically significant, include the following:

- Meals cooked from HelloFresh meal kits produce on average 36.4 percent less household food waste than similar meals cooked using ingredients purchased in grocery stores. Redesigning a small number of recipes and/or revising vendors' specifications could increase this difference.
- Location and household size impact the level of food waste created by HelloFresh meal kits and grocery purchased meals. Suburban households typically reported a higher volume of plate waste followed by preparation waste than urban households. Household size impacts the generation of food waste, most commonly reported was due to children being fussy eaters.
- The median time taken to purchase meals from grocery stores was 87.5 minutes. Therefore, a person shopping for three meals for a two-person household spends ~1.5 hours shopping
- The median time taken to prepare grocery purchased ingredients is 30 minutes per week longer than the time taken to prepare HelloFresh meals.
- HelloFresh meal kits included a smaller number and range of primary packaging materials/ formats than respondents reported for grocery store purchased foods. Packaging associated with HelloFresh meals is typically more recyclable than grocery purchased ingredients.

Table of Contents

List of Tables

List of Figures

1 Purpose

The purpose of the study conducted by Value Chain Management International (VCMI) for HelloFresh Canada (HelloFresh) was to quantify the impact on household (HH) food waste[1] through the use of a direct-to-consumer meal kit model compared to food waste resulting from consumers having purchased raw ingredients from grocery stores before preparing similar meals from scratch. The study took place within the Greater Toronto Area (GTA). The research also sought to quantify indicatively the impact of meal kits on food household packing waste in the GTA at a micro level. Both the food waste and packaging analysis was conducted at a micro (i.e., consumer) level.

Encompassing 96[2] meal occasions and 288[3] individual meals (plates), the methodology described below enabled statistical robust conclusions to be drawn on differences existing – at aggregated and granular levels – between the following:

1. Preparation and plate waste resulting from HelloFresh meal kits vs. meals produced from ingredients purchased at grocery stores;
2. HH size, location and occurrence of preparation waste and plate waste;
3. Primary and secondary packaging associated with HelloFresh meal kits vs. meals produced from ingredients purchased at grocery stores;
4. Comparative recyclability of packaging associated with HelloFresh meal kits vs. meal ingredients purchased at grocery stores; and
5. Time required to receive, prepare and serve HelloFresh meal kits, vs. time required to prepare a shopping list, drive to and purchase ingredients in the grocery store, put ingredients away, then prepare and serve meals using ingredients purchased at the store.

While the sample size is comparatively small, given the nuances that exist within the Canadian population due to cultural, socio-economic and geographical reasons, an added purpose behind the project was to complete a proof of concept. Lessons learned from this project could be incorporated into fuller, more statistically representative regional, national or international analysis at a future point in time.

[1] The terms “food waste” and “food loss and waste (FLW)” are used interchangeably.

[2] One household (2S3) did not complete the third meal kit, due to the individuals experiencing an unusually busy week and perishable items having spoiled before they could prepare the meal. They intended to use less perishable items (incl. mayonnaise, spices) the following week. The mean (average) FLW produced from this household’s records of food waste produced by the two prior meal kit was therefore substituted in place of primary data.

[3] Eight households x 3 meal occasions per week x 2 people x 2 weeks = **96**; 8 households x 3 meal occasions per week x 4 people x 2 weeks = **192**. **96 + 192 = 288**

2 Methodology

The project incorporated consumer research, including direct communication with 16 households, and also a packaging analysis (both described later in more detail).

2.1 Participating Households

Primary data was gathered from participating households recording data using the participant instruction sheets that are attached as a separate PDF file. The instruction sheets were designed to produce robust insights on the impact of meal kits on food waste and other attributes associated with meal kits' value (incl. purchasing and preparation time), measured by 1) weight of off-cuts, and 2) time commitment/ constraints (incl. time taken to complete shopping trip). Due to time constraints, the research was limited to a small number of households located within the GTA. As shown below in Table 2-1 the research:

- Encompassed two categories of family units: 1) two-person, and 2) four-person – in both urban and suburban regions of the GTA
    - Targeting four households from each category located in each region = 16 households
- Included provision of three meals per household each week over a two-week period[4]
    - Week 1: HF meal kits
    - Week 2: raw ingredients purchased from retail stores, prepared from scratch
- Produced data on targeted 96 meal occasions (see table below)
    - In total producing data points on 288 individual meals
- Captured and sourced data from each household via a combination of phone calls, emails, photographic documentation and survey completion

Table 2-1: Research Model – Meal Occasion Breakdown

HelloFresh Canada		
	Urban	**Suburban**
Two-person family	4	4
Four-person family	4	4
Subtotal target meals occasions	**24**	**24**

Purchased from Grocery Store[5]		
	Urban	**Suburban**
Two-person family	4	4
Four-person family	4	4
Subtotal target meals occasions	**24**	**24**
TOTAL TARGET MEAL OCCASIONS	**96**	

Encompassing the above households ensured that the research could produce a range of statistically valid insights that could be extrapolated, within limitations, to the wider Canadian populous.

[4] The household participation period was actually extended to three weeks to accommodate three family units.
[5] Throughout this report the terms "grocery," "grocery store/purchased" and "shop for" are interchangeable.

2.2 Individual Recipes

As shown below in Table 2-2, the participating households prepared a total of 32 recipes over the two phases. For the most part, individual households followed the researchers' request for them to replicate similar recipes in phase two to those prepared in phase one from HelloFresh meal kits. The downside to not all households preparing the exact same meals in phases one and two is that it limits the extent to which findings can be extracted from a granular like-for-like perspective. The upside is that it enables more robust statistical conclusions to be drawn at an aggregated level, which are therefore applicable to a wider range of foods and households. It also allows the results, within distinct limitations, to be extrapolated with a degree of certainty to a national perspective.

Table 2-2: Recipes Followed over Phase I and II

Recipe (as recorded by individual households)	HelloFresh – Phase I	Grocery – Phase II	Total
Almond Crusted Chicken	3	-	3
Bacon, Chili Flakes & Butternut Squash Risotto	6	5	11
BBQ Dry-Rub Chicken	1	2	3
Beef Dip with Fries	1	1	2
Cajun Halloumi Burgers	2	2	4
Fajita-Style Chicken Bowl	4	2	6
Open-faced Turkey Sandwich	3	3	6
Pan-Seared Steak	5	2	7
Pork Spring Roll Bowl	1	2	3
Pork Tacos	4	2	6
Roasted Root Veggie Medley	1	1	2
Shrimp Pad See Ew	4	2	6
Sundried Tomato & Spinach Penne	1	1	2
Thai Basil	1	-	1
Tomato Garlic Beef Spaghetti	5	4	9
Veggie Chili	3	1	4
Yoghurt @ Dukkha Crusted Chicken	3	3	6
Barley with Chicken Broth, Zucchini	-	1	1
Chicken Parmesan with Pasta	-	1	1
Chicken Stew	-	1	1
Chili	-	1	1
Greek Chicken and Rice and Salsa	-	1	1
Meatballs with Green Beans	-	1	1
Mustard and Herb Crusted Pork	-	1	1
Pea and Bacon Penne	-	1	1
Pea Meal Sandwiches	-	1	1
Salmon, Rice, Peas & Baby Artichokes	-	1	1
Spaghetti with Meat Sauce	-	1	1
Steak, Potatoes & Veggies	-	1	1
Sweet Potato Roast with Roasted Veggies	-	1	1
Tuscan Sausage Linguine	-	1	1
Zucchini Noodles with Parmesan	-	1	1
	48	**48**	**96**

2.3 Household Packaging Analysis

The research encompassed an indicative analysis of packaging associated with HelloFresh versus ingredients purchased at a grocery store. This indicative analysis sought, at an aggregated perspective, to quantify differences between:

- Primary and secondary food packaging associated with meal kits versus consumers having purchased raw ingredients from retail stores; and
- The recyclability of packaging types and counts identified during the household analysis.

2.4 Data Collection and Analysis

The process that participating households followed to capture and report data on individual meals, the purchasing of ingredients at grocery stores, and the packaging associated with store purchased meal ingredients is contained in the attached PDF file. The majority of participants submitted photographs of their individual records immediately after each meal, then couriered the completed data sheets to VCMI at the conclusion of the research. This enabled VCMI to track responses, ensure data was being recorded correctly, and encourage respondents to complete the research as intended.

As it became available, data was entered into the statistical analysis software "Minitab." The analysis investigated differences in food waste, packaging, and other variables occurring between the four household groups using one and two-way "Analysis of Variance" (ANOVA) to test differences in means. In assessing differences in means, we set a statistical significance level of 95 percent (or higher) and an Alpha risk – incorrectly accepting a difference when there was no difference – of five percent (0.05) or lower.

As presented in the following section, the output of the data analysis is presented graphically in three ways.

The first means of graphical representation is through a series of boxplots with sample means connected. When testing a hypothetical difference in means we require >95% confidence – or a P value =/< 0.05. Thus, while the graphics may show a difference, if the P value > 0.05, then we fail to reject the null in favour of the alternate hypothesis. A P value that is lower than 0.05 (e.g. 0.046) shows that statistically significant differences exist between the factors being analyzed.

The second form of graphical presentation is Pareto charts. These are used to show the percentage contribution of attributes to the total – such as preparation and plate waste by recipe. The principle behind the analysis is the 80/20 rule: the majority of the contribution to a situation comes from a few factors.

The third form of graphical presentation is a summary of descriptive statistics. These show the distribution and statistics on the amount spent per meal (total spend divided by number of plates served: 6 or 12 depending on household size over three meals). The same analysis is provided for total distance travelled to the store for "shop for" meals.

As described in Section 4, at the conclusion of the data recording process and to assist the research team to interpret the findings, the main contact at each household participated in a follow-up "debrief" phone call with VCMI.

2.5 Limitations

A number of limitations should be noted about the research and analysis. These include:

- One household was unable to cook their third meal kit. To enable completion of the statistical analysis as intended, we used the average numbers recorded for the previous two meals.
- Two households recorded the time they sat down to eat as the serve time. For consistency, after analyzing other households' responses, we allocated two minutes for their serve time.
- Most households completed the shop in one trip. Some, however, completed two trips and a few completed three shopping trips. We combined all of the information provided.
- The scenario presented in Section 3.5 should be used with caution. Whereas the entire preparation of store-purchased ingredients typically occurs in the home, an unknown percentage of the preparation waste associated with HelloFresh meal kits occurs further up the chain, either at HelloFresh or at second-tier vendors rather than in the household.

3 Results of Data Analysis

3.1 Food Waste by Source, House Size and Location

Following are results produced by the statistical data analysis. The ANOVA generated box (and whisker) plots show comparative differences in statistical terms (e.g. total food waste from meal kits vs. grocery). How to interpret the box plots:

- The distance across the tips of the whiskers (the vertical line) shows the data range, minus any outliers which are shown as asterisks;
- Fifty percent of the data (responses) fall within the boxes contained in the box plots, with the line across each (the median) showing the demarcation between the values contained in the lower fifty percent and upper fifty percent of responses; and
- The cross-hairs indicate the mean amount, with the horizontal line connecting them to show the comparative differences.

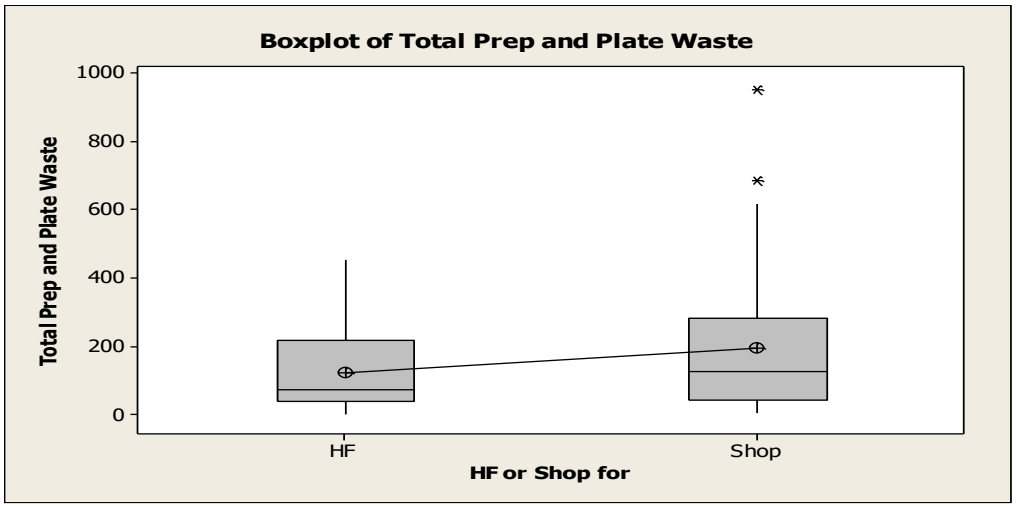
A point worth noting is that, as shown by all the comparative heights of the box plots and whiskers, meals cooked from HelloFresh kits consistently exhibited a narrower (tighter) range in resulting food waste than the food waste that resulted from meals cooked using store purchased ingredients. This suggests that there is greater variation in waste from food ingredients purchased from retail stores than contained in HelloFresh meal kits, a factor influenced by consumer choice.

3.2 Total Food Loss and Waste (FLW)

A statistically significant difference (P = 0.045) exists between the total average FLW of 122 grams found to result from HelloFresh meal kits versus the 192 grams of total average FLW for grocery purchased meals, on a per meal basis. In Figure 3-1 presented below, the Y axis is grams. As can be seen by the outliers, while this is not an exact like-to-like comparison of the relationship between specific recipes and food waste, the total FLW created by meals prepared and cooked from ingredients

purchased in grocery store can be close to double that of total FLW associated with HelloFresh meal kits.

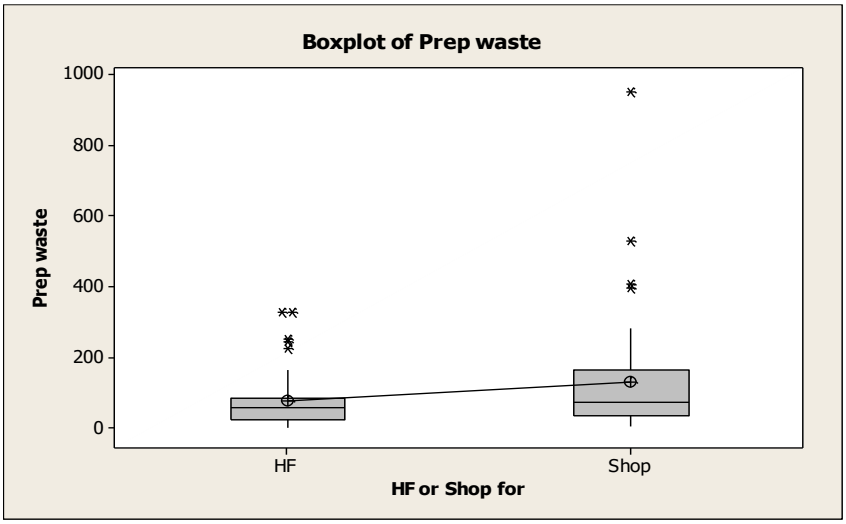
Figure 3-1: Total Prep and Plate Waste – HF versus "Shop for"



3.2.1 Preparation Waste

The preparation waste resulting from HelloFresh meal kits averaged 76.5 grams per plate, while the per plate preparation waste meals made ingredients purchased at grocery stores averaged 130 grams. This difference between the two means is statistically significant at P = 0.046. In Figure 3-2 below, the Y axis is in grams.

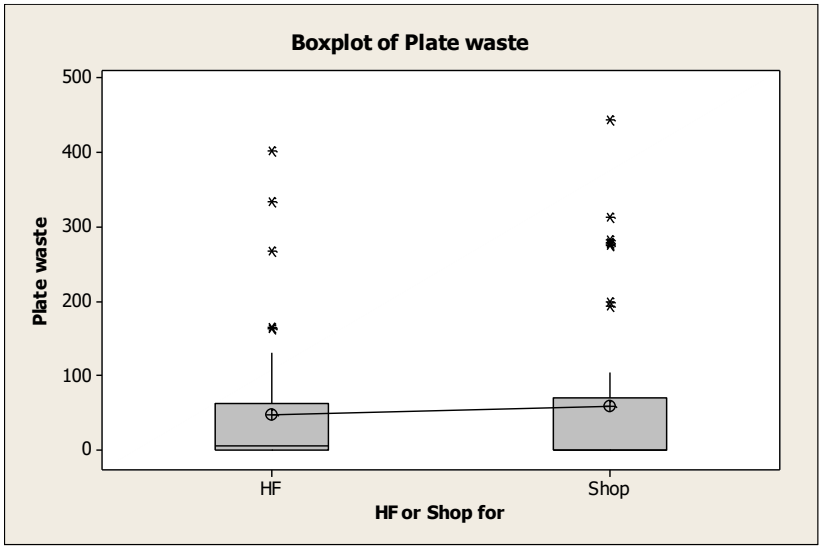
Figure 3-2: Total Prep Waste – HF versus "Shop for"



3.2.2 Plate Waste

The per-meal comparative plate waste of HelloFresh versus grocery meals is 48 versus 58 grams, as shown below in Figure 3-3. This difference (P = 0.620) is not statistically significant. Subsequent analysis of data during the follow-up calls with individual households identified that the primary source of plate waste is individuals', most commonly children, dislike of specific foods. Paraphrasing one of the respondents: "My child is a picky eater and won't eat green beans." Serving size is said to be a lesser cause of plate waste. In the chart below, the Y axis is in grams.

Figure 3-3: Total Plate Waste – HF versus "Shop for"



3.2.3 Total FLW by Location and Household Size

Figure 3-4 below shows that a statistically significant relationship exists between both household size and location in terms of the amount of total food waste that results from meals cooked from ingredients contained in meal kit versus those purchased from a grocery store – the P values for location and meal type (HF/Shop for) being 0.000 and 0.032, respectively. There is a statistically significant difference between the factors of household location/size and meal type (HF/Shop for) on the amount of total food waste. In general, while suburban households reported a higher volume of plate followed by preparation waste than urban households, household size appears to have the greatest impact on the generation of food waste – particularly for meals cooked with ingredients purchased from grocery stores.

Figure 3-4: Total FLW by Location and Household Size – HF versus "Shop for"

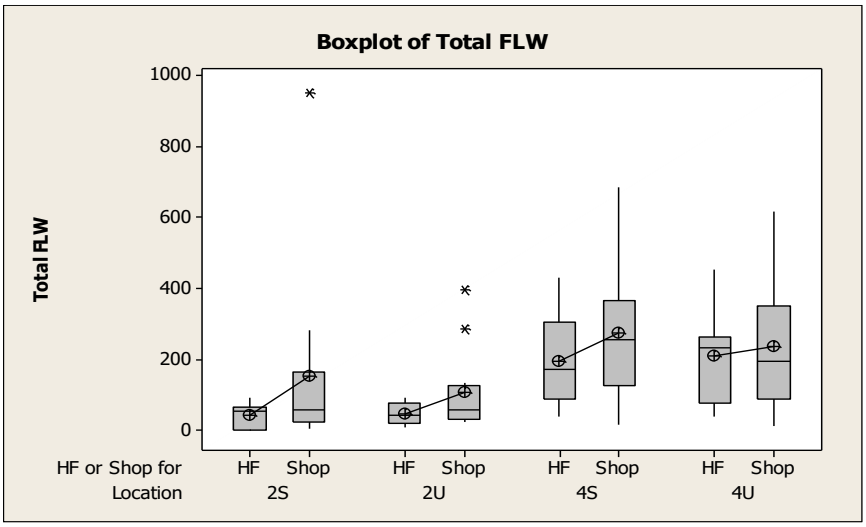
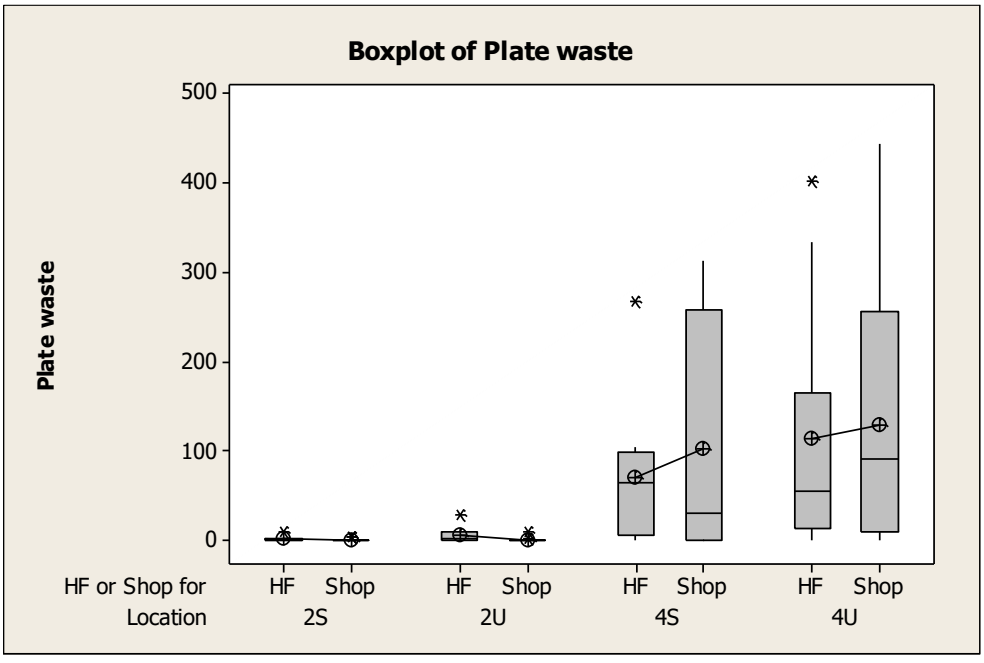


Figure 3-5 below emphasizes the impact of individuals' food preferences, particularly children, on plate waste stemming from meals regardless of their source. (During the post-study briefing with households it was noted by a couple of families that their children, who were "fussy eaters" do not like leftovers for lunch the next day, unlike the parents.) The per person plate waste of two-person households is statistically lower than the per person plate waste of four-person households, regardless of location (P = 0.000). Within four-person households, the plate waste associated with HelloFresh is distinctly lower than that associated with grocery sourced foods, though the impact of whether they live in a suburban versus urban environment (P = 0.569) is not statistically significant.

Figure 3-5: Total Plate Waste by Location and Household Size – HF versus "Shop for"



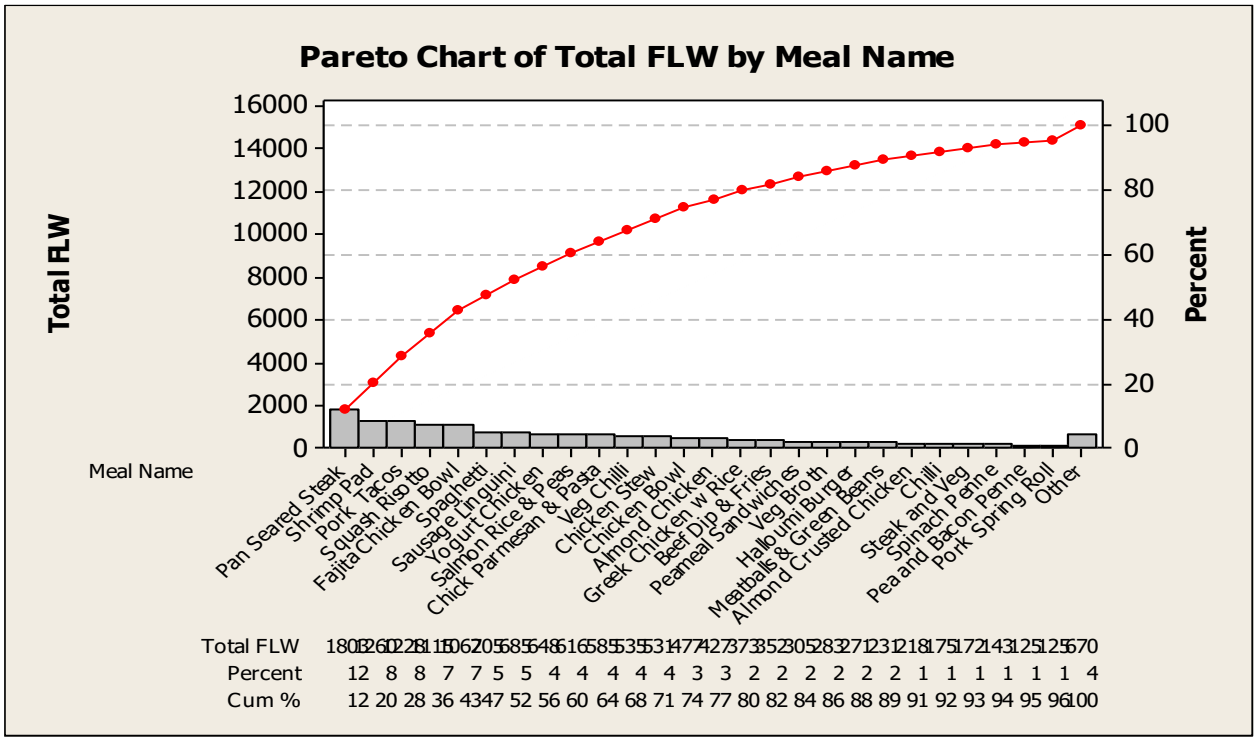
3.3 Impact of Recipe and Source on Food Waste

The following Pareto analysis shows correlations between individual recipes and the occurrence of FLW – overall, preparation and plate. The following Pareto charts show granular comparisons, with 95 percent of contributions to total weights/percentages/counts listed individually. The final five percent of the total weights/percentages/counts is grouped into one category: "other." Hence not all recipes are listed on each chart, but rather are included in the "Other" category. Please note that the red line indicates the cumulative percentage contribution.

3.3.1 Total FLW by Recipe (HelloFresh and Grocery)

Shown below in Figure 3-6 is the contribution to total food waste (prep and plate) of each recipe. All of the top five contributors to the 16 kilos of total food waste identified during the study were consumed by four-person households. In the next three charts, the grams that each recipe contribute to food waste is identified on the left hand Y axis; the percentage that this weight contributes towards the cumulative total mass is identified on the right hand axis.

Figure 3-6: Total FLW by Each Recipe – HelloFresh and "Shop for" Combined

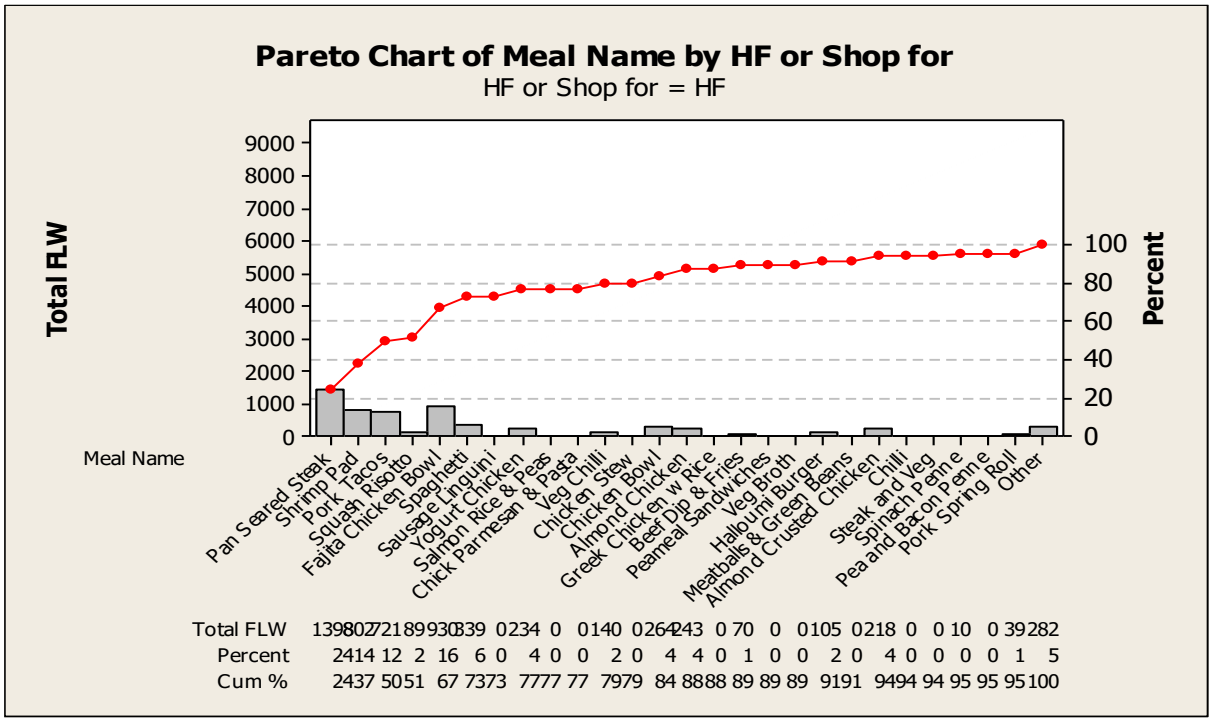


In HelloFresh sourced meals, the highest occurrence of prep waste occurred in Pan Seared Steak (consumed on 5 out of 48 meal occasions), followed equally by Pork Tacos (consumed on 4 out of 48 meal occasions). In HelloFresh sourced meals, the highest occurrence of plate waste occurred in Fajita-Style Chicken Bowl (consumed on 4 out of 48 meal occasions), followed equally by Pan Seared Steak and Shrimp Pad See Ew (consumed on 5 and 4 times, respectively out of 48 meal occasions). *[Refer to Table 2-2 on page 6 for itemized list of recipes.]*

As can be seen in the track taken by the cumulative percentage line contained in the Pareto analysis (incline before almost plateauing), for all other recipes the weight of preparation and plate loss from HelloFresh meal kits was considerably less (e.g. <50 percent). This includes the most commonly consumed recipe: Bacon, Chili Flakes & Butternut Squash Risotto.

Shown below in Figure 3-7 is the total food waste by recipe for HelloFresh meal kits.

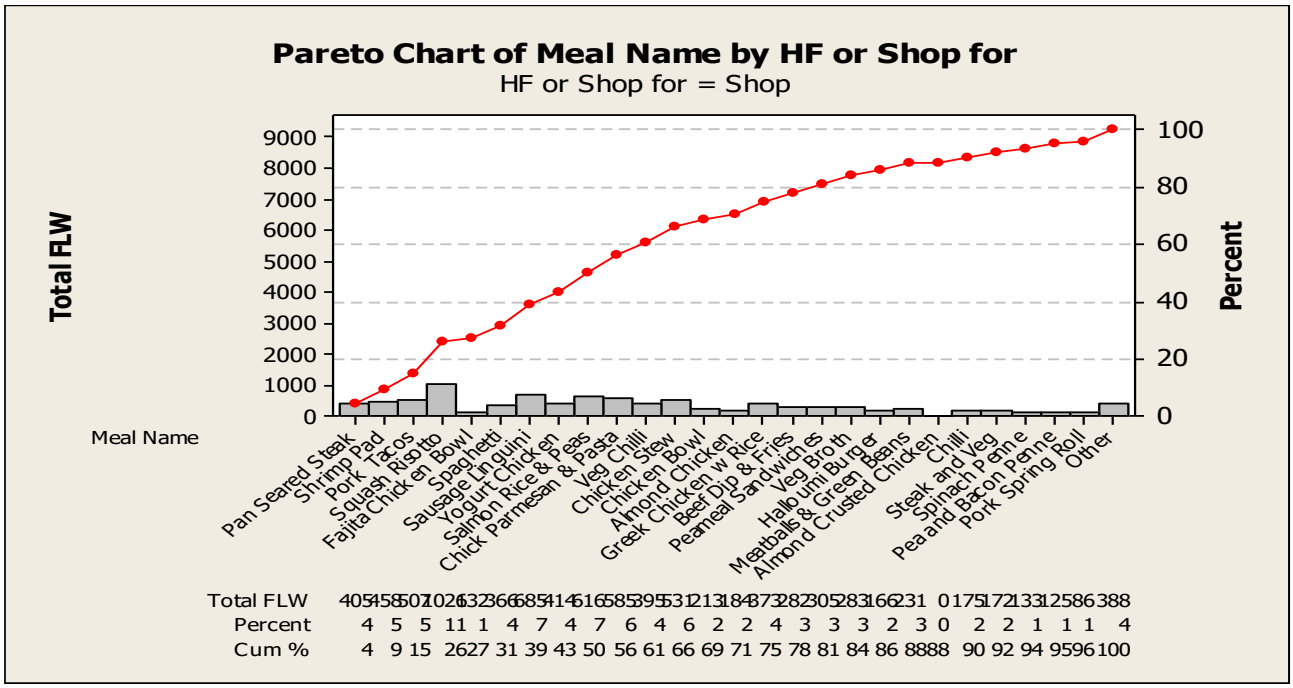
Figure 3-7: Total Food Waste by Recipe – HelloFresh Only



The above findings suggest that HelloFresh could further reduce the occurrence of household food waste by redesigning a number of its recipes or revising the specifications provided to vendors.

As can be seen below in Figure 3-8, a quite different line is taken by the Pareto analysis of total food waste resulting from meals cooked from store purchased ingredients. The reasonably steady incline reflects that, with one exception, significant differences do not exist between recipes' impact on total food waste. The exception is Bacon, Chili Flakes & Butternut Squash Risotto.

Figure 3-8: Total Food Waste by Recipe – "Shop for" Only



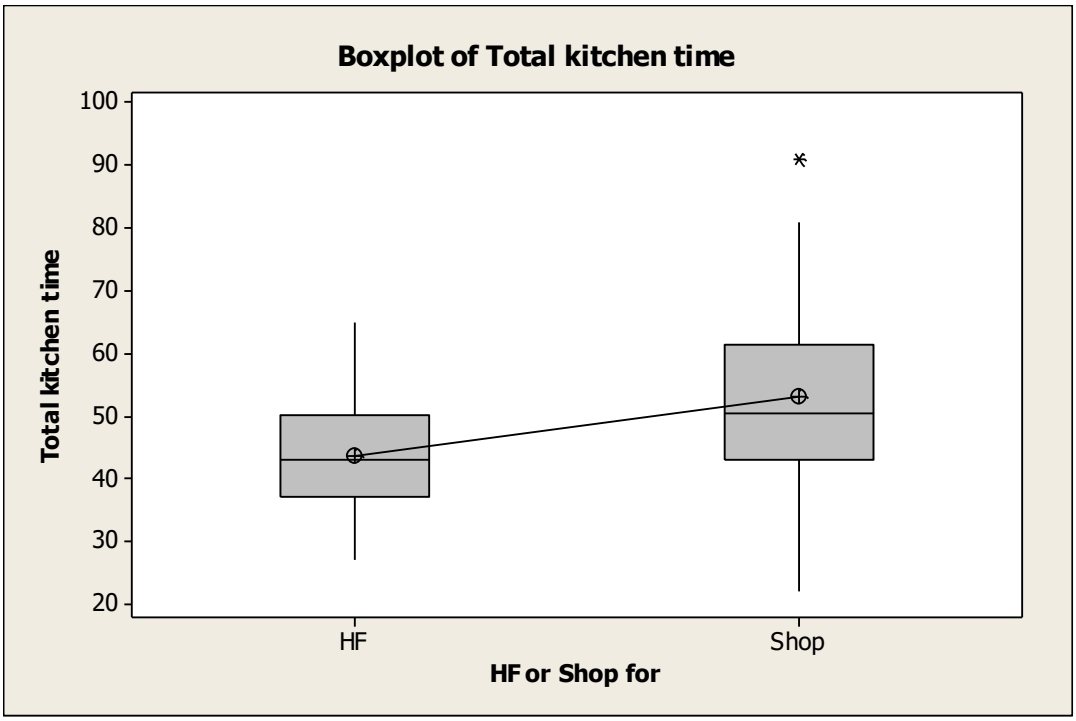
Further recipe analysis identified that in grocery sourced meals, the highest occurrence of preparation waste occurred in Bacon, Chilli Flakes & Butternut Squash Risotto (consumed on 5 out of 48 meal occasions). This was due to the peel of the squash being cut-off during preparation. Chicken Parmesan with Pasta (consumed on 1 out of 48 meal occasions) exhibited the highest occurrence of plate waste, followed by Pan Seared Steak (consumed on 2 out of 48 meal occasions).

3.4 Time, Cost and Overall Value

3.4.1 Preparation, Cook and Serve Time

Presented below in Figure 3-9 is the comparative total preparation, cook and serve time for meals produced from HelloFresh versus grocery store sourced ingredients. A one-way ANOVA analysis showed on average the total preparation, cook and serve time for HelloFresh meal kits is 10 minutes less than that associated with grocery bought ingredients (43 versus 53 minutes, respectively). This difference in means is statistically significant with a P value of 0.000. Regardless of household size, the same holds true. That similar results were recorded by suburban and urban respondents showed that location does not impact meal preparation, cook and serve time.

Figure 3-9: Total Preparation, Cook and Serve Time – HelloFresh vs. "Shop for"



3.4.2 Meal Costs and Travel Time

An analysis of meal costs was based on the value of the meals kits supplied to the 16 participating households being $1,664.84, while the store purchase price for the ingredients for the equivalent "shop for" meals was $1,461.34 ($203.50 less). A detailed summary of comparative costs are contained in the Appendix.

Based on 96 meal occasions, $203.50 equates to a $2.12 difference between HelloFresh and grocery purchased per meal occasion. Based on the total number of individual meals (plates) across the two weeks (n=288), this equates to a $0.71 per plate difference. The cost difference is further narrowed by shoppers simultaneously incurring additional costs, including fuel, vehicle wear and tear, and parking or transit fees. The average distance covered by shoppers during the purchasing of ingredients from grocery stores was 7.76 kms. The distance covered by those shoppers that relied on public transport and the cost of such is unknown. The time taken to shop using public transport was stated as being close to two hours.

Variants in Actual Numbers of Individuals per Household

A note with regards actual individuals per household: calculations in this report correspond to two-person or four-person households. In reality, three "two-person" households comprised a single individual per household, two "four-person" households comprised three people, and one "four-person" household comprised only two people. (These actual number of individuals per household are included in the Excel spreadsheet accompanying the report.)

3.4.3 Overall Value

The difference in value mentioned above does not take into account purchased items at the grocery store that were in excess of the recipes and therefore remained unused. (The post-study survey confirmed that in most circumstances perishable items, such as herbs or salad mixes, spoiled and were discarded.)

In total, the 16 households completed 25 shopping occasions, the maximum number of shopping occasions per household being three. The total shop time (from preparing a shopping list to buying, then putting purchased items away on returning home) reported by participating households ranged from 55 to 218 minutes, the median being 87.5 minutes. Therefore, a person shopping for three meals for a two-person household spends ~1.5 hours shopping and saves on average a maximum of $12.72.

The overall value of time saved using HelloFresh meals is therefore significant. The median total time saved is two hours per household, per week. This includes time involved in purchasing ingredients from grocery stores, travel time, putting ingredients away, and food preparation time.

3.5 Extrapolating Food Waste Research Results

Recent research conducted by VCMI, in partnership with Second Harvest,[6] estimated annual household food waste to be 5.14 million tonnes. This included preparation and plate waste. The underlying data in the project was from 2016, at which point there were 14 million private households in Canada (Statistics Canada, 2017). This equates to 1kg of food waste per household, per day, or 7kg per week.

The research described in the previous sections identified a 36.4 percent reduction in household food waste when participants prepared three evening meals per week using HelloFresh meal kits versus preparing and consuming meals using ingredients purchased at grocery stores.

To enable the research findings to be extrapolated nationally, we created the scenario presented below in Table 3-1. The scenario assumes that half of a daily household's 1kg food waste results from the dinner (evening meal). We therefore reduced 0.5kg of food waste by 36.4 percent, which was then multiplied by three meals per week and subtracted from the estimated average weekly household waste of 7 kg.

Table 3-1: National FLW Scenario

Estimated household waste (annually)	5.14 million tonnes
Households in Canada	14,072,080
Average weekly household waste	7.00 kg
Weekly reduction of household waste with HelloFresh	14%

[6] Gooch, M., Bucknell, D., LaPlain, D., Dent, B., Whitehead, P., Felfel, A., Nikkel, L., Maguire, M. 2019. *The Avoidable Crisis of Food Waste: Technical Report*; Value Chain Management International and Second Harvest; Ontario, Canada. Accessible from: https://secondharvest.ca/wp-content/uploads/2019/01/Avoidable-Crisis-of-Food-Waste-Technical-Report-January-17-2019.pdf

As shown above, this scenario resulted in the average household food waste being reduced to 6.05 kg per week. Preparing three meals per week using HelloFresh meal kits therefore offers households the potential to reduce their household food waste by 14 percent, compared to them preparing and cooking those same meals from ingredients purchased in a grocery store.

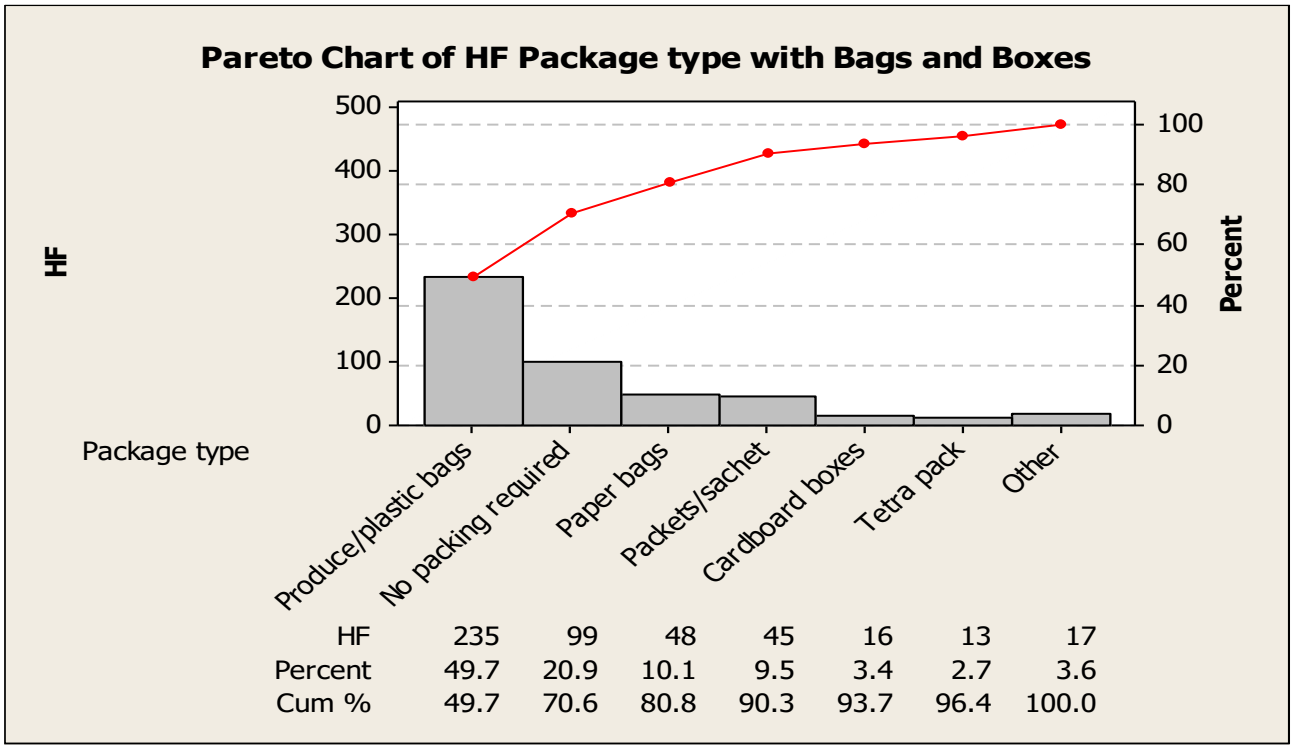
This scenario should be used with caution, as a percentage of the preparation waste associated with HelloFresh meal kits that occurs further up the chain, either at HelloFresh or at their vendors rather than in the household, has not been quantified.

3.6 Packaging

An indicative analysis was completed to compare the type and likely recyclability of packaging associated with HelloFresh meal kits versus food ingredients purchased in grocery stores. The findings are presented below as Pareto charts. An immediate conclusion drawn from the analysis is the lower proliferation of primary package types (n= 7) compared with the 13 types of packaging associated with meal ingredients purchased from grocery stores.

Figure 3-10 presents a summation of packaging type used by HelloFresh, including paper bags and the cardboard boxes (often termed secondary packaging) in which the meal kits are delivered. The chart shows the total amount of packaging received by all participating households, categorized by type. Taken from an Excel sheet provided by HelloFresh, the Y axis is the packaging materials count. The right hand axis and Pareto line show the cumulative contribution of each packaging type (in percent) to the overall packaging count.

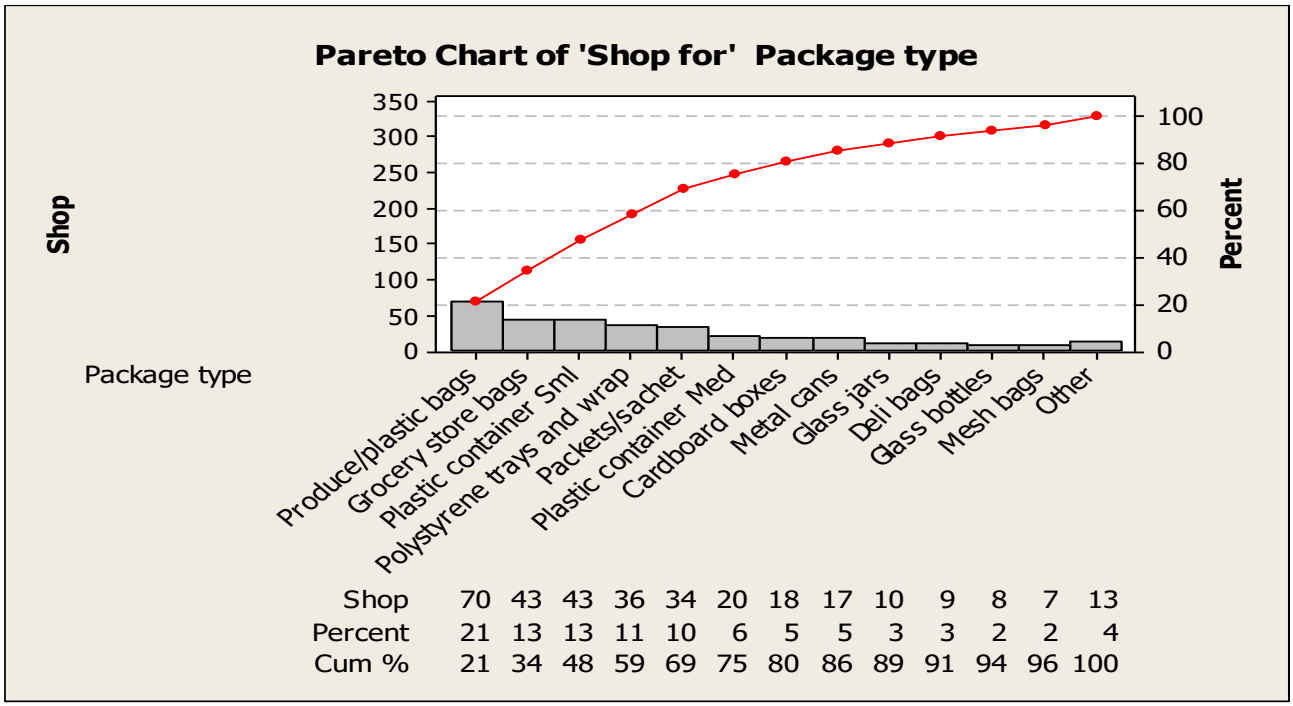
Figure 3-10: HelloFresh Packaging Type



In total, there were 374 items of packaging associated with the HelloFresh meal kits delivered to the participating households. This count includes 64 external (secondary) cardboard boxes and paper bags. It excludes the 99 items that did not require packaging.

Presented below in Figure 3-11 is a summation of packaging types received by participating households after having purchased their meal ingredients in grocery stores. Contained within the 13+ types of packaging identified below are 328 separate packages. As with the above figure, the right hand axis and Pareto line shows the cumulative contribution in percentage terms to the overall packaging count.

Figure 3-11: Grocery Bought Packaging Type



The most common type of packaging used by HelloFresh and grocery stores is plastic produce bags. The range of packaging materials and formats in which meal ingredients purchased at grocery stores are packaged versus those used by HelloFresh is likely to negatively impact their recyclability. Grocery stores package foods in ways that HelloFresh does not, and which are definitely not recyclable, such as polystyrene trays and wrap.

Participants' suggested a number ways in which HelloFresh could decrease its use of packaging and increase the recyclability of the packaging that could not be replaced by other means. These suggestions are highlighted in Section 4.

The following photos portray a comparison between the HelloFresh food (packaged) and the grocery-bought food (packaged) for one of the chosen recipes: BBQ Dry-Rub Chicken.

BBQ Dry-Rub Chicken

4 Summary of Household Communication and Feedback

Over the three-week period of the household (HH) participation phase, VCMI engaged in daily contact with each HH via text, email and/or phone calls to ensure the information gathered was in line with the requested data and to answer any questions arising from the activities. Each HH provided photographs of their daily sheets – both for the HelloFresh meal kit and grocery bought meals.

During week three and four, VCMI conducted a post-study phone survey to gain insights into general and specific participants' responses towards pre-conceived and resultant actual conclusions regarding food and packaging waste from HelloFresh versus grocery bought meals. The survey responses are included in a separate Excel file. For confidentiality purposes, the HH identifiers have been removed.

Below are some key comments that arose from the survey. These include a number of suggestions for HelloFresh with regards specific food items or packaging in terms of possible waste reduction.

- In general, grocery store waste (food and packaging) was noted as being much greater than HelloFresh waste. (There were a few exceptions, as noted in the Excel file.)
- HelloFresh is a great time saver; grocery shopping takes more time (preparing list, travel and actual shopping).
- HelloFresh is more convenient.
- HelloFresh packaging is less and mostly recyclable; whereas grocery bought involves a lot of small bags, exterior bags and unrecyclable materials, such as Styrofoam.
- Less prep waste with HelloFresh, as portions are measured; a lot of prep waste with grocery bought (e.g. cutting up butternut squash).
- For the majority, most leftover food overall was consumed and did not result in further food waste. (Exceptions were perishable items, such as herbs, which were discarded.)

Suggestions/comments for HelloFresh regarding packaging:

- The most common concern was for the HelloFresh box
    - Could it be reusable?
    - Could it be replaced by a cooler, which could be collected and redistributed each week?
    - Can a regular bag be used instead?
- Could there me more bio-degradable packaging ("as long as it doesn't increase the price!")?
- Could HelloFresh pick up recyclable packaging/boxes, ice packs, etc. when next meal is dropped off?
- Could spices be placed in paper packets rather than plastic?
- Instead of a chopped onion, can HelloFresh provide a small onion to eliminate the plastic bag?

Suggestions/comments for HF regarding ingredients:

- If ingredients are required for more than one meal, provide said ingredient in one package for the 2 or 3 meals, i.e. combine into one package instead of using 3 plastic bags/containers.
- Could HelloFresh provide larger quantities (e.g. bottles of vinegar, spices) to accommodate 4 weeks' worth – therefore reduce packaging (for long-time users)?

- Provide a checklist of ingredients, so that customers can identify which ingredients they do not like (e.g. sour cream), so that they are not wasted. Then this could be flagged for future orders.
- With regards checklist – could customers highlight ingredients they don't require, as they are typically staple items (e.g. mayo, mustard, seasoning)?

The overall response to the study was positive, with one HH participant stating: "This was really helpful for me to see the benefits of HelloFresh. It is great that they are doing this study; I applaud them."

The following communications documents are attached as separate files:

- Household Instruction Sheet (PDF)
- Detailed Participant Data (Excel)
- Post-study Survey Responses (Excel)