"The Ultimate Goal is the Best Health Possible": Exploring Collaborations Between the Food Safety and Food Security Sectors in British Columbia, Canada

by

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Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of

Contributions included in the thesis. This is a true copy of the thesis, including any required final

revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

With the exception of the content noted below, the work of this thesis consists of content that I authored.

Key informant interviews

This thesis employed a secondary data analysis of key informant interviews with public health practitioners working in food safety and food security in British Columbia. I was a research assistant for the original data collection, and assisted in the development of the semi-structured interview guide, drafting and submitting the ethics application, recruiting participants, conducting a literature search, and taking extensive notes throughout the interviews themselves. In addition, I transcribed one of the transcripts in full, and crosschecked all of the transcripts against the audio-files for accuracy. I also anonymized the transcripts by removing any identifiers, including name, position and organization of each participant. The primary researcher for this study was Dr. Shannon Majowicz, and the study was conducted in consultation with the British Columbia Centre for Disease Control, specifically Dr. Karen Rideout, and Melanie Kurrein.

Chapter 4

I conducted the data analysis for this chapter and drafted the manuscript in close consultation with Dr. Shannon Majowicz. As co-authors, Dr. Majowicz, Dr. Samantha Meyer, and Dr. Rhona Hanning all provided written input on manuscript drafts. All co-authors approved the final manuscript before submission to *Health Promotion and Chronic Disease Prevention in Canada* Special Issue on *the Food Environment in Canada* on October 31, 2016.

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Chapter 5

     I conducted the data analysis for this chapter in close consultation with Dr. Shannon Majowicz. I wrote this chapter, with input from Dr. Shannon Majowicz, Dr. Samantha Meyer, and Dr. Rhona Hanning on early drafts.

Abstract

Introduction: In Canada, foodborne disease and food insecurity are both important health issues that share many common drivers. However, the public health sectors that aim to address each of these issues typically work separately from each other. Despite the silo-ing of the two sectors, British Columbia has many examples of successful collaborations, and therefore is an excellent setting to explore collaborations between the two sectors. Thus, the objectives of this thesis were to: (i) identify examples of the intersection of food safety and food security efforts in public health practice; and (ii) explore facilitators and barriers for collaborations between public health practitioners of the food safety and food security sectors.

Methods: Semi-structured interviews were conducted with 14 public health practitioners working in the food safety and food security sectors in British Columbia, and qualitative analyses were conducted to identify examples of intersections between the two sectors, as well as factors that influence the success of collaborations between practitioners of the two sectors.

Results: Participants identified four key ways that the two sectors intersect. They identified ways in which their daily practices could be helped or hindered by the activities of the other sector, including because of historically disjointed policies that do not consider multiple health outcomes related to food, and because specific types of food products, such as fresh produce, can be considered either risky or beneficial depending on the perspective taken. Finally, they recognized that both sectors are working towards the same overall goal of improved population health, albeit using slightly different lenses. In addition to the ways that the two sectors intersect, participants identified many examples of factors that influence the success of collaborations between practitioners of the two sectors, including many factors that could be considered facilitators when present and barriers when absent, and other factors that could be

considered both facilitators and barriers, depending on the perspective through which the factor was viewed. These factors were as follows: personal connections with those in the other sector, and to those who have already successfully collaborated; purposeful engagement with different types of people who bring value; openness to, and understanding and valuing, the goals, outcomes and restrictions of the other sector; creative, realistic, and solutions-oriented problem solving targeted to desired outcomes; and recognizing that the issues are connected, and actively work with that in mind. One factor, believing that one position is more important than the other due to its external importance or legitimacy, was identified as exclusively a barrier to collaboration. Finally, participants identified broader environmental factors that needed to be recognized as influencing the success of collaborations, but that collaborations could proceed in spite of when there were other facilitators in place.

Conclusion: In British Columbia, the food safety and food security sectors, and the health issues they aim to address, are intimately connected to each other. It is therefore important that practitioners of the two sectors work together when developing and implementing public health efforts to address their respective health issues, in order to reduce the potential negative impacts they may have on the health outcome of the other sector. To this end, participants discussed factors that could inhibit or facilitate collaboration between practitioners of the two sectors, as well as specific ways that practitioners of the two sectors can better support successful collaboration with the other sector, in their quest to achieve the best possible health of the population of British Columbia.

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List of Abbreviations

BC – British Columbia

BCCDC – British Columbia Centre for Disease Control

CFIA – Canadian Food Inspection Agency

EHO – Environmental Health Officer

FAO – Food and Agriculture Organization of the United Nations

GAP – Good Agricultural Practices

HACCP – Hazard Analysis Critical Control Point

PHAC – Public Health Agency of Canada

PHSA – Provincial Health Services Authority

UBC – University of British Columbia

USA – United States of America

WHO – World Health Organization

1. Introduction and Overview

The food we consume strongly impacts our health and wellbeing, including both mental and physical wellbeing. There are a variety of health issues that can occur as a result of our diet, and two important ways that food can affect our health and wellbeing are through exposing us to microorganisms and other contaminants that can cause foodborne disease (e.g., Havelaar et al., 2015), and through inadequate access to the food necessary to live a healthy and happy lifestyle, known as food insecurity (e.g., Food and Agriculture Organization of the United Nations [FAO], n.d.).

Foodborne diseases result from the consumption of food contaminated with microorganisms (i.e., bacteria, viruses, and parasites), as well as chemicals and toxins (Havelaar et al., 2015). The outcomes of foodborne disease range from mild gastrointestinal symptoms such as diarrhea, to death (Havelaar et al., 2015). Other possible outcomes of foodborne disease include severe acute diseases like hemolytic uremic syndrome, which has the potential to cause renal failure, and chronic diseases like inflammatory bowel syndrome (Lindsay, 1997). A recent World Health Organization (WHO) report estimated 600 million cases of foodborne disease occur globally each year, including 420,000 deaths (Havelaar et al., 2015). In Canada, 4 million cases of foodborne disease have been estimated to occur per year, from both known and unknown foodborne hazards, that were acquired domestically (Thomas et al., 2013). In order to address foodborne diseases in the population, governments dedicate resources to preventing these illnesses; in developed countries, this most often takes the form of organized food safety functions within health and public health agencies, who undertake and support initiatives including legislation (e.g., *Public Health Act,* 2008; *Safe Food for Canadians Act,* 2012), inspection of food operations (e.g., Vancouver Coastal Health, 2014), surveillance of foodborne

diseases (e.g., Canadian Food Inspection Agency [CFIA], 2015; Public Health Agency of Canada [PHAC], 2016), outbreak investigations and food recalls (e.g., MacDonald et al., 2004; McIntyre, Wilcott, & Naus, 2015; Shah et al., 2009; J. Taylor et al., 2012; M. Taylor et al., 2012; Taylor et al., 2013), consumer education (e.g., Bourne, 2003; Vancouver Coastal Health, 2014), and food handler education (e.g., FOODSAFE, 2009).

Food insecurity occurs when people do not have "access to sufficient, safe, nutritious food to maintain a healthy and active life" (FAO, n.d.), and it can result in many health consequences, including mental health issues such as depression, and physical health issues such as diabetes (Vozoris & Tarasuk, 2003). Globally, 795 million people are hungry (FAO, International Fund for Agricultural Development, & World Food Programme, 2015). In Canada, 4 million individuals and approximately 13% of Canadian households experienced food insecurity in 2012 (Tarasuk, Mitchell & Dachner, 2014). In order to address food insecurity in the population, governments and non-governmental organizations dedicate resources to improving access to healthy food; in developed countries, this most often takes the form of organized food security functions within health and public health agencies and community organizations, who provide support for community initiatives including food banks (e.g., Ford, Lardeau, Blackett, Chatwood, & Kurszewski, 2013), coupon programs (e.g., BC Association of Farmers' Markets, 2014), and urban agriculture (e.g., City of Vancouver, 2016).

The issues of foodborne disease and food insecurity are interconnected in many ways. Foodborne disease and food insecurity may have common risk factors, for example low income, that can be considered a risk factor for food insecurity (e.g., Broughton, Janssen, Hertzman, Innis & Frankish, 2006; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015), and may be considered a risk factor for foodborne disease (e.g., Gillespie, Mook, Little, Grant, &

McLauchlin, 2010). In addition, both the organized function of food safety and the range of

activities undertaken to reduce foodborne disease (hereafter, collectively referred to as the 'food

safety sector') and the organized function of food security and the range of activities undertaken

to reduce food insecurity (hereafter, collectively referred to as the 'food security sector') can

impact each other, both positively and negatively. While both sectors aim to improve population

health, some of their actions may unintentionally negatively influence the outcome of the other

sector. For example, the 2004 British Columbia (BC) Meat Inspection Regulations designed to

improve food safety limited meat production in remote communities, and ultimately reduced

food security (Miewald, Ostry, Hodgson, 2013; Miewald, Hodgson, Ostry, 2015). On the other

hand, food security programs, designed to provide healthy food such as fresh fruits and

vegetables to the public, that do not consider food safety may increase the population's risk of

foodborne disease, as fresh produce causes the largest amount of foodborne disease outbreaks in

the United States of America (USA; Painter et al., 2013).

Due to the potential for complicated interconnections between foodborne disease and

food insecurity, as well as between the food safety and food security sectors, particularly within

public health practice, it may be important for the two sectors to work together more explicitly in

order to improve the population's health. Within the province of BC, for example, there are

documented examples of tensions (e.g., the 2004 Meat Inspection Regulations; Miewald et al.,

2013; Miewald et al., 2015) and successful collaborations (e.g., creating food safety guidelines

for specific food security initiatives, such as temporary food markets; BC Centre for Disease

Control [BCCDC], 2014) between the two sectors. However, there is limited literature exploring

the intersection between the public health actions within food safety and food security, or the

health outcomes they address, and there is little research on how the two sectors have worked, or

are currently working, together. Therefore, the overall goal of this thesis is to explore

collaborations between the food safety and food security sectors, within the realm of public

health practice in BC, to ultimately identify ways to support improved population health.

2. Literature Review

This literature review presents an overview of the impacts of foodborne disease, and the types of public health efforts taken within Canada to reduce foodborne disease, the impacts of food insecurity, and the types of public health efforts taken within Canada to reduce food insecurity, the relationships between the two health issues and their respective public health efforts, and examples of the relationship between the two public health efforts in BC's public health system.

2.1 Foodborne Disease and the Associated Public Health Efforts

Foodborne Disease Impacts

Foodborne disease is an important health issue around the world. There are many different hazards that can cause foodborne disease, including bacteria, viruses, parasites, chemicals and toxins (Havelaar et al., 2015). These hazards cause a range of symptoms: mild symptoms including diarrhea (Havelaar et al., 2015); severe acute outcomes such as hemolytic uremic syndrome, which can lead to renal failure (Lindsay, 1997); chronic conditions including inflammatory bowel disease (Lindsay, 1997); and even death (Havelaar et al., 2015). Globally, 600 million cases of foodborne disease and 420,000 deaths occurred in 2010 from 31 known foodborne hazards (Havelaar et al., 2015). While developing countries typically experience greater amounts of foodborne disease than developed countries (Havelaar et al., 2015), foodborne disease is still an important issue in Canada. Specifically, 4 million cases of foodborne disease occur each year in Canada from both known and unknown agents, excluding those acquired internationally (Thomas et al., 2013). In addition to the large number of foodborne disease cases, domestically-acquired foodborne disease from both known and

unknown agents also leads to 11,632 hospitalizations and 238 deaths among Canadians each year (Thomas et al., 2015).

The impacts of foodborne disease vary across the provinces and territories, and certain subpopulations, in Canada. Because the most common clinical outcomes of foodborne diseases are vomiting and diarrhea, many Canadian studies that aimed to understand the foodborne disease burden investigated acute gastrointestinal illness, which includes vomiting and diarrhea (e.g., Harper, Edge, Ford, Thomas et al., 2015; Sargeant, Majowicz, & Snelgrove, 2008; Thomas et al., 2006). For example, a study conducted in Ontario estimated that 1.17 cases of acute gastrointestinal illness occur per person-year (Sargeant et al., 2008). The rate of acute gastrointestinal illness in BC is similar, at 1.3 cases per person-year (Thomas et al., 2006), with an average cost of $113.70 per case (Henson et al., 2008; Henson et al., 2011). Despite the similarity in gastrointestinal illness rates in these two Canadian provinces, certain subpopulations in Canada have higher rates than the general population. For example, the estimated rate of gastrointestinal illness in an Indigenous community in Rigolet, Nunatsiavut is 3.8 cases per person-year, and the estimated rate in Iqaluit, Nunavut is 3.8 cases per person-year at the same time of year (Harper, Edge, Ford, Thomas et al., 2015). This may mean that Indigenous subpopulations across Canada experience higher rates of gastrointestinal illness than the general population.

The burden of foodborne disease extends beyond the health impacts experienced by ill individuals. The largest factor influencing the cost of acute gastrointestinal illness in the population is time spent away from work (Henson et al., 2008). Other economic impacts include the recall of contaminated and potentially contaminated food products (e.g., MacDonald et al., 2004; McIntyre et al., 2015; M. Taylor et al., 2012; Taylor et al., 2013). Therefore, if the

economic burden of missed work and the costs to the food industry is included, the burden posed by foodborne disease in Canada may be higher than previously thought.

<u>Public Health Efforts in Canada</u>

The food safety sector of public health aims to reduce foodborne disease in the population. The federal and provincial governments both play a role in regulating the safety of the food produced in and entering Canada (FAO & WHO, n.d.). At the federal level, Health Canada is responsible for research, as well as policies and regulations to maintain safe food production, which are enforced by the CFIA (CFIA, 2015; FAO & WHO, n.d.; Health Canada, 2012b). These policies and regulations include the *Safe Food for Canadians Act* (2012), which regulates the safe production and sale of food commodities; the *Food and Drugs Act* (1985), which regulates the safety of food that is sold in Canada, as well as how products can be advertised; the *Meat Inspection Act* (1985), which regulates the safe production and trade of meat products in Canada; and the *Health of Animals Act* (1990), which protects the health of animals. The CFIA also outlines federal food safety requirements for the food industry, including the Hazard Analysis Critical Control Point (HACCP) system (CFIA, 2014), which is designed to address food safety throughout processing by focusing on implementing control measures at points in processing where food safety issues may arise, rather than simply testing the end product (Ropkins & Beck, 2000). PHAC conducts surveillance of foodborne diseases through several surveillance systems, namely FoodNet Canada, the Notifiable Disease Surveillance On-Line system, the National Enteric Surveillance Program, and PulseNet Canada (CFIA, 2015; PHAC, 2016).

At the provincial level in BC, the Ministry of Agriculture, Ministry of Health, and the seven health authorities (including five regional health authorities, the First Nations Health

Authority, and the Provincial Health Services Authority [PHSA]) enforce provincial food safety legislation along the farm-to-fork continuum to reduce the risk of the population's exposure to unsafe food (First Nations Health Authority, 2016; Government of British Columbia, n.d.[a]; Government of British Columbia, n.d.[c]). Provincial food safety legislation includes the *Food Safety Act* (2002), which regulates food safety along the farm-to-fork continuum, including its inspection and enforcement; the *Public Health Act* (2008), which regulates activities to protect public health, including reporting illnesses and conducting inspections to test samples for contamination; and the *Food Safety Act: Meat Inspection Regulation* (2004), which regulates meat production. There are also provincial guidelines designed for specific food safety contexts, such as the Temporary Food Markets: Guideline for the Sale of Foods at Temporary Markets (BCCDC, 2014), the Guidelines for Food Distribution Organizations with Grocery or Meal Programs (BCCDC, Greater Vancouver Food Bank, & Food Banks BC, 2016), and the Guidelines for Cutting and Wrapping Uninspected Meat (BCCDC, 2012).

At the local level in BC, environmental health officers (EHOs), operating under the five regional health authorities and the First Nations Health Authority, inspect food premises to ensure that regulations are being met, and food is being produced safely (e.g., Vancouver Coastal Health, 2014). In BC, 'food premises' are defined as "any place where food intended for public consumption is sold, offered for sale, supplied, handled, prepared, packaged, displayed, served, processed, stored, transported or dispensed" and include places like restaurants, but do not include places like food banks (*Public Health Act: Food Premises Regulation*, 1999). In addition to food premise inspections, EHOs also aim to reduce foodborne diseases through education to those who handle food, including commercially (FOODSAFE, 2009) and at home (e.g., Bourne, 2003; Vancouver Coastal Health, 2014). When outbreaks of foodborne disease do

occur, as seen by increased levels of foodborne disease in the population, health authorities work with the appropriate agencies at the provincial and federal level to investigate the outbreak, determine the cause, mitigate risk, recall affected product, warn the public about the danger, and communicate safe food handling practices (e.g., MacDonald et al., 2004; McIntyre et al., 2015; Shah et al., 2009; J. Taylor et al., 2012; M. Taylor et al., 2012; Taylor et al., 2013).

2.2 Food Insecurity and the Associated Public Health Efforts

Food Insecurity Impacts

Food insecurity is another health issue that is very important around the world. According to the World Food Summit Plan of Action, "[f]ood security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, n.d.). Food insecurity occurs when people do not have access to enough healthy food, including fresh fruits and vegetables, to maintain adequate nutrition (Slater & Yeudall, 2015; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015), as well as when people do not have enough money to purchase enough food (Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015). There are many factors that increase the risk of food insecurity, including having a low income, the source of household income, presence of children in the home, and neighbourhood access to healthy foods (e.g., Broughton et al., 2006; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015; Vozoris & Tarasuk, 2003). Food insecurity is associated with impaired physical health, including diabetes, and impaired mental health, including depression (Vozoris & Tarasuk, 2003).

Globally, 795 million people do not have access to enough food, and as a result are hungry (FAO et al., 2015). This global burden exerts most of its impact in developing countries

(FAO et al., 2015), but food insecurity is also an important issue in Canada. Specifically, 4 million Canadians experienced food insecurity in 2012 (Tarasuk et al., 2014). This measurement does not include certain populations, including prisoners or on-reserve First Nations populations (Tarasuk et al., 2014). The rate of food insecurity in an on-reserve First Nations community in Fort Albany, Ontario has been estimated to be 70.3% (Skinner, Hanning, & Tsuji, 2013); therefore, the rate of food insecurity in Canada may be higher than previously estimated. Similar to foodborne disease, food insecurity affects certain areas of the country more than others. For example, Nunavut had the highest rate of household food insecurity in Canada in 2012 (Roshanafshar & Hawkins, 2015; Tarasuk et al., 2014). Household food insecurity is lower in BC, but still affects many people within the province, as 225,600 households were food insecure in 2012 (Tarasuk et al., 2014). In addition to the varying extent of household food insecurity across Canada, certain populations are more severely affected by food insecurity than others. For example, food insecurity affects more households with children under 18 years old than those without children (Roshanafshar & Hawkins, 2015; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015). Households with lower incomes are also more likely to experience food insecurity (Broughton et al., 2006; Roshanafshar & Hawkins, 2015; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015; Vozoris & Tarasuk, 2003). The rate of food insecurity also changes across cultural and racial groups, and immigration status (Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015; Weiler et al., 2015).

Similar to foodborne disease, individuals living in food insecure households have higher average annual health care costs than individuals living in food secure households (Tarasuk, Cheng et al., 2015). A study in Ontario estimated that individuals living in marginally food insecure households, moderately food insecure households, and severely food insecure

households had average annual health care costs that were $235, $455, and $1092 higher than food secure households, respectively (Tarasuk, Cheng et al., 2015).

Public Health Efforts in Canada

The food security sector of public health aims to increase access to healthy, safe, and culturally appropriate food. To support international efforts, Canada has a Food Security Strategy to aid developing countries in improving food security (Global Affairs Canada, 2014), which aims to increase access to healthy and safe food, and support agriculture development and research in developing countries (Global Affairs Canada, 2014). In terms of food insecurity in Canada, the federal, provincial and local levels of public health all play a role in reducing food insecurity. At the federal level, Canada has an Action Plan for Food Security that outlines Canada's priorities for reducing food insecurity, including decreasing poverty, increasing access to traditional indigenous food (e.g., food obtained through hunting or fishing; King & Furgal, 2014), and promoting sustainability (Government of Canada Joint Consultative Group, 1998). Health Canada monitors food insecurity in Canada through the Household Food Security Survey Module in the Canadian Community Health Survey, and the Survey of Household Spending (Health Canada, 2012a). In addition to the governmental roles in food security, there is also a national alliance, called Food Secure Canada, which includes organizations such as the Dietitians of Canada, the Greater Vancouver Food Bank Society and the Poverty and Hunger Working Group (Food Secure Canada, n.d.[a]). This alliance aims to reduce hunger, promote sustainability and ensure the safety and nutritional quality of available food (Food Secure Canada, n.d.[b]).

At the provincial level in BC, the Ministry of Health and the PHSA support collaboration between many stakeholders to share knowledge and resources on food security improvements

(Government of British Columbia, n.d.[b]; PHSA, 2016b). There are many provincial and community level initiatives designed to increase the population's access to healthy food and decrease the impacts of food insecurity in BC. These include the Community Food Action Initiative, which encourages food insecurity solutions from the community level (Government of British Columbia, n.d.[b]); the Farmers' Market Nutrition Coupon Program, which provides Farmers' Market coupons to vulnerable populations (BC Association of Farmers' Markets, 2014) and the BC Food Security Gateway, which is a website that provides resources about food security in BC (PHSA & the Public Health Association of BC, n.d.).

At the local level, the regional health authorities participate in these collaborations and implement initiatives (Government of British Columbia HealthLink BC, n.d.; PHSA, 2016b). Public health dietitians provide support for community initiatives designed to increase the population's access to healthy food, like community gardens and gleaning projects (e.g., Interior Health Authority, 2016a; Interior Health Authority, 2016b). In addition to the governmental roles in addressing food insecurity, non-profit organizations are also involved in food security improvement. For example, programs like food banks and soup kitchens provide food for many people who are in need (Bocskei & Ostry, 2010; Rideout, Riches, Ostry, Buckingham, & MacRae, 2007).

2.3 The Interrelationship Between Foodborne Disease and Food Insecurity

Foodborne disease and food insecurity both arise within the larger food system, and do not occur in isolation of each other. The two health issues appear to interact in many ways, listed here and discussed in detail as follows. These interactions can include food insecurity and food security behaviours acting as risk factors for increased foodborne disease, and risk factors being

common to both foodborne disease and food insecurity. While not emphasized in the literature, it may also be possible that foodborne disease can act as a risk factor for food insecurity. Certain broader issues, such as climate change, can also influence foodborne disease and food insecurity, and may be considered a common risk factor, although evidence is less clear.

One way that foodborne disease and food insecurity can interact at the population level is that food insecurity may act as a risk factor for foodborne disease. Food insecurity can result in poorer health, including increased risk of obesity (Broughton et al., 2006), which may decrease overall immune system function (Marti, Marcos, & Martinez, 2001). Populations with weakened immune systems, which can also include children and the elderly, can be at greater risk for foodborne disease (Lund, 2015). Therefore, food insecure individuals may be at greater risk of foodborne disease than food secure individuals.

Another way that foodborne disease and food insecurity are associated at the population level is that foods that are associated with good food security may pose an increased foodborne disease risk. For example, increased access to fresh fruits and vegetables can benefit food insecure individuals, but also increase foodborne disease risk, as follows. Access to enough healthy food, such as fresh fruits and vegetables, is an important component of food security. A healthy diet may be difficult to achieve for people who are food insecure, as the cost of food that can contribute to a healthy diet has increased in price in BC (PHSA, 2016a). In order to address this issue, many food security initiatives aim to increase access to fresh fruits and vegetables through providing resources, for example, how to increase healthy eating while on a budget (e.g., BC Association of Farmers' Markets, 2014). However, many foodborne disease outbreaks have been linked to fresh produce (e.g., Kozak, MacDonald, Landry, & Farber, 2013; Sewell & Farber, 2001; Shah et al., 2009), and produce is now the leading cause of illnesses in foodborne

disease outbreaks in the USA (Painter et al., 2013). In addition to fresh produce, ethnic food, whose consumption may be important for certain cultures and is therefore a component of food security, has also been linked to foodborne disease outbreaks in the United States (e.g., Bennett, Walsh, & Gould, 2013; Quinlan, 2013; Simonne, Nille, Evans, & Marshall, 2004). Finally, access to food produced on small-scale farms may be considered beneficial for food security, and small-scale farms may have different foodborne disease risks than larger farms (e.g., Baron & Frattaroli, 2016; Miewald et al., 2013; Miewald et al., 2015). Therefore, it is important to consider that protecting food security by increasing access to fresh produce, ethnic food, and small-scale agriculture may increase an individual's foodborne disease risk.

An additional way that foodborne disease and food insecurity may be connected is through common risk factors. For example, low income can be considered a risk factor for food insecurity (e.g., Broughton et al., 2006; Tarasuk et al., 2014; Tarasuk, Mitchell, & Dachner, 2015), and may be a risk factor for foodborne disease as well. Specifically, a study of *Listeria* infection in England found higher risks in more deprived neighbourhoods (Gillespie et al., 2010). Individuals in lower socioeconomic neighbourhoods may have access to large grocery stores less, and smaller stores more (Gillespie et al., 2010; Quinlan, 2013). These small stores may have food of lower microbial safety, for reasons such as increased temperature abuse and higher contamination of produce (Koro, Anandan, & Quinlan, 2010; Quinlan, 2013; Signs, Darcey, Carney, Evans, & Quinlan, 2011). Access to grocery stores may differ when available transportation and neighbourhood safety are taken into account (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). For example, Bader et al. (2010) found that adjusting for high crime can reduce access to grocery stores for poor neighbourhoods, but adjusting for hazardous traffic

conditions can reduce access in high-income neighbourhoods, showing that socioeconomic status alone is not enough to determine access to grocery stores.

Despite the above connections with low income as a common risk factor for foodborne disease and food insecurity, some studies have found an association between higher income and increased foodborne disease. For example, a study of *Campylobacter* infection in Maryland, USA found that higher income neighbourhoods had higher rates of infection than lower income neighbourhoods (Zappe Pasturel et al., 2013), a trend that was also seen in other high-income countries (Newman, Leon, Rebolledo, & Scallan, 2015). *Salmonella* infections have been associated with both high and low income neighbourhoods in Toronto (Varga et al., 2013), while in Mississippi, *Salmonella* infections were higher in low-poverty areas (Akil & Ahmad, 2016). In Connecticut, rates of *Salmonella* infection have been associated with high socioeconomic status, although the association differed by age and serotype (Whitney et al., 2015). Therefore, the association between income and foodborne disease risk may vary by pathogen, as well as by different types of the same bacteria.

The connection between income and risk of foodborne disease is unclear for other pathogens. For example, Jalava, Ollgren, Eklund, Siitonen, and Kuusi (2011) found that *E. coli* infection was associated with low-income households that contain children, while Whitney et al. (2015) found that rates of *E. coli* infection were associated with higher socioeconomic status. A review of the literature found mixed results for *E. coli* infections and socioeconomic status (Newman et al., 2015). Although the association between income and foodborne disease risk may not be clear, it is an important factor in the relationship between foodborne disease and food insecurity.

Climate change may be another issue that impacts both foodborne disease and food insecurity, although how climate change will affect each of these issues remains unclear. The effects of climate change will vary geographically (Curtis & Halford, 2014; Lake et al., 2012; Miraglia et al., 2009). Increased temperature, drought, and changes in weather patterns that may result from climate change may disrupt the growth of crops (Ahdoot, Pacheco, & the Council on Environmental Health, 2015; Curtis & Halford, 2014) and alter the environment of foodborne pathogens (Ahdoot et al., 2015; Miraglia et al., 2009). These changes in weather may harm crops (Ahdoot et al., 2015; Curtis & Halford, 2014), which could result in less food produced globally, and thus increased food insecurity. However, increased temperature and other results of climate change could benefit crop growth, and ultimately improve the availability of food (Curtis & Halford, 2014). Therefore, the effect of climate change on food insecurity depends on how climate change influences the weather. In addition to its influences on the amount of food that is produced, climate change can also alter the nutritional quality of crops (Ahdoot et al., 2015; Halford, Curtis, Chen, & Huang, 2015). This can in turn influence the health of the populations that consume the crops. Climate change can also influence foodborne disease through altering the environment in which pathogens live (Ahdoot et al., 2015; Miraglia et al., 2009; Wilkinson et al., 2011). If climate change alters where pathogens can live, it would also alter the relationship between pathogens and the food we consume, and ultimately could change the population's risk of foodborne disease (Ahdoot et al., 2015; Miraglia et al., 2009).

First Nation populations are especially vulnerable to the impacts of climate change on foodborne disease and food insecurity, as climate change can influence the availability of traditional indigenous food, and can decrease the safety of traditional indigenous food consumption (Harper, Edge, Ford, Willox et al., 2015). Climate change results in changes in the

environment, which in turn alters the presence of animals and other food (e.g., berries; Harper, Edge, Ford, Willox et al., 2015; King & Furgal, 2014). A decrease in animals and plants used for traditional indigenous foods would ultimately decrease food security (Gadamus, 2013; Harper, Edge, Ford, Willox et al., 2015; King & Furgal, 2014). In addition, extreme weather can decrease food delivery to these remote communities, ultimately reducing food security (Harper, Edge, Ford, Willox et al., 2015). Temperature changes as a result of climate change can increase foodborne disease risk through its effect on traditional indigenous food preparation and storage (Harper, Edge, Ford, Willox et al., 2015; King & Furgal, 2014). Increased temperature can result in an environment that is more conducive to pathogen growth, and ultimately can result in greater food contamination (Harper, Edge, Ford, Willox et al., 2015).

In addition to the interrelationship topics outlined above, there are other domains where foodborne disease and food insecurity likely overlap, including education (e.g., Thomas et al., 2006), race (e.g., Signs et al., 2011; Zappe Pasturel et al., 2013), body mass index (e.g., Steeves, Silbergeld, Summers, Chen, & Gittelsohn, 2012), health care access (e.g., Majowicz et al., 2016), and sustainable farming practices (e.g., Nguyen-the et al., 2016), but these are beyond the scope of this thesis. In addition, living in a rural location may be associated with the risk of foodborne disease and food insecurity, but is not included in this literature review as environmental exposure to pathogens may be higher in rural locations due to the presence of farm animals, and may influence the rates of infection with pathogens (e.g., Zappe Pasturel et al., 2013).

2.4 The Interrelationship Between Food Safety and Food Security Public Health Efforts

Despite the emerging recognition of connections between the health issues that the food safety and food security public health sectors are aiming to improve, as well as their shared ultimate goal of promoting population health, these sectors have historically been situated in separate branches within public health organizations. In addition to, and potentially because of, their segregation within the public health system, the actions they perform to improve their respective health issues may be disconnected from the other sector's actions. However, there are examples of specific activities that have included the other sector within their design and implementation. While the degree to which the food safety and food security sectors collaborate with the other sector varies but generally seems to be poor, BC appears to be a leader both in terms of having some connections between the two sectors within the public health system, as well as examples of one sector incorporating the other sector within specific activities.

Within the public health system, the food safety and food security sectors are often disconnected from each other. In Canada, the federal roles for addressing food safety are outlined in a relatively detailed manner (e.g., CFIA, 2015), but there is limited information on how the federal government addresses food security. However, it seems likely that the two functions are carried out separately from each other, as publically available information from PubMed and government agency websites do not relate the two sectors. The disconnection between the food safety and food security sectors of public health appears to be similar in other developed countries, including the USA (e.g., Shannon, Kim, McKenzie, & Lawrence, 2015). In the USA, the Food Safety and Inspection Service of the United States Department of Agriculture (United States Department of Agriculture, 2015), the Centers for Disease Control (Centers for

Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases, & Division of Foodborne, Waterborne, and Environmental Diseases, 2016), and the Food and Drug Administration (U.S. Food and Drug Administration, 2016) all play a role in ensuring food safety. However, publically available information regarding the federal role in domestic food security is limited to the United States Department of Agriculture's role (United States Department of Agriculture, 2016). Within publically available information for the USA government agencies, food safety and food security efforts are often discussed separately as well, with exceptions such as food safety education that is available for individuals providing food in schools and children programs (United States Department of Agriculture Food and Nutrition Service, 2016a) and other resources for those providing food for children (United States Department of Agriculture Food and Nutrition Service, 2016b). The lack of connection between food safety and food security appears to be similar in Australia, New Zealand, and the United Kingdom, as PubMed and government agency website searches yielded a similar level of disconnect between the two sectors. In contrast, Italy has a Food Safety and Nutrition Service that recognizes the connection between foodborne disease and food insecurity, and works to improve population health through improving both foodborne disease and food insecurity, although the single available reference is difficult to understand, and thus may not accurately reflect how food safety and food security are situated in the Italian public health system (Guberti, 2014).

Food safety and food security public health efforts can also integrate at the level of specific activities that are designed to improve the health outcomes of each sectors, for example community gardens that aim to increase access to fresh fruits and vegetables. One such approach is through considering food safety as a part of food security, and addressing food safety within

food security initiatives. For instance, initiatives that aim to increase nutrition knowledge through education may include food safety education within their curriculum (e.g., Dollahite, Pijai, Scott-Pierce, Parker & Trochim, 2014). In addition, food safety knowledge may be important for program coordinators of school nutrition programs (Valaitis, Hanning, & Herrmann, 2013). Another example of how food safety can be addressed within food security initiatives is in urban gardens. For example, urban soil may be contaminated with heavy metals (Angotti, 2015; Kaiser, Williams, Basta, Hand, & Huber, 2015), and thus soil testing and corrective actions may need to occur in order to ensure the safety of the produce grown in these gardens. In addition, participants in focus groups also stated concerns with animal access and other sanitation issues related to the safety of food grown in urban gardens in Ohio (Kaiser et al., 2015). Therefore, if food security initiatives do not address food safety, the participants may not properly benefit from increased access to healthy food, and the participants may be at increased risk of foodborne disease.

Food safety policies that do not address scale may have negative effects on food security. For instance, the Meat Inspection Regulations that were enacted to improve the safety of meat produced in BC negatively affected food security in remote communities (Miewald et al., 2013; Miewald et al., 2015). In addition, these Regulations also had negative affects on food safety, as some farmers continued to produce meat despite the Regulations and without any provincial oversight (Miewald et al., 2013; Miewald et al., 2015). In order to counteract the negative effects of the Regulations, amendments were made that allow small-scale slaughtering to ensure safety of the meat while recognizing the effects of scale (Miewald et al., 2013). However, regulations may be able to fit multiple scales. In Michigan, for example, some food safety inspectors were able to interpret regulations to fit small-scale processing operations (Buckley,

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2015). The ability to adjust food safety regulations in terms of small-scale processing operations

varied between inspectors and operators, and required positive relationships between the two, the

inspectors to take an educational approach rather than an enforcement-oriented approach, and

having conversations with each other (Buckley, 2015). Therefore, in order to ensure the

population benefits from public health efforts, it is important that food safety initiatives

recognize their role in food security.

There is limited research on how public health practitioners in food safety and food

security can collaborate. Martin and Perkin (2016) explored how to better support collaborations

between food safety and food security practitioners in Canada by examining how to best address

the tensions that are felt between the sectors. They asked participants to identify the ways in

which practitioners working in the food safety and food security sectors can reduce these

tensions, and the results outlined the importance of communicating in a constructive manner with

each other; understanding what the other sector is trying to achieve, as well as the potential risks

associated with food, and regulations that may be in place; educating the public on food safety

and food security; collaborating more formally on public health efforts between the two sectors;

and recognizing the difference between small-scale and larger-scale operations in terms of food

safety requirements and capacities. While Martin and Perkin (2016) provide an excellent starting

point for understanding how practitioners in the food safety and food security sectors can reduce

tensions between them, more in-depth exploration of facilitators and barriers to collaboration is

necessary in order to identify how collaborations can be better supported within the public health

system.

The province of BC appears to be more advanced than Canada and the USA in terms of

recognizing the importance for collaborations between the food safety and food security sectors,

both within the public health system and in specific activities designed to improve population health. For example, the British Columbia Provincial Health Officer (2006) Annual Report addressed the connection between food and health, which included both food safety and food security issues. In addition, food safety and food security are both considered core public health functions in BC (e.g., BC Health Authorities, Population Health and Wellness, & BC Ministry of Health, 2006; Population and Public Health & BC Ministry of Health, 2014), and both programs explicitly make the connection to the importance of addressing the efforts of the two sectors together (BC Health Authorities et al., 2006; Population and Public Health & BC Ministry of Health, 2014). BC also has demonstrated collaboration between the food safety and food security sectors within specific activities that aim to improve population health, including food safety guidelines for various initiatives that work to improve food security, such as the Temporary Food Markets: Guideline for the Sale of Foods at Temporary Markets (BCCDC, 2014), and the Guidelines for Food Distribution Organizations with Grocery or Meal Programs (BCCDC et al., 2016).

2.5 Food Safety and Food Security in British Columbia

Foodborne disease and food insecurity are both important issues in BC, causing circa 1.3 cases of acute gastrointestinal illness per person-year (Thomas et al., 2006), and affecting 12.7% of households (i.e., 225,600 households; Tarasuk et al., 2014), respectively. To address these important issues, BC undertakes a variety of public health functions. Within these public health activities, there are examples of how food safety and food security efforts have negatively impacted the health outcomes of the other sector (e.g., the 2004 Meat Inspection Regulations; Miewald et al., 2013; Miewald et al., 2015), and there are examples of successful collaborations

between the two sectors (e.g., food safety guidelines designed for specific food security initiatives; BCCDC, 2014; BCCDC et al., 2016). In addition to the examples of collaboration between the two sectors within specific public health activities, the BC public health system also makes explicit the importance of addressing food safety and food security together (e.g., BC Health Authorities et al., 2006; Population and Public Health & BC Ministry of Health, 2014).

Despite the large burden foodborne disease and food insecurity exert in BC, and the recognized importance of collaboration between the food safety and food security sectors of public health, there is limited research on how these collaborations happen or how to better support these collaborations going forward. Martin and Perkin (2016) have provided a preliminary look at potential actions that can be taken to reduce tensions between the two sectors, but more in-depth research is needed to identify how food safety and food security efforts are related to each other in practice, and to explore the barriers and facilitators to collaboration. Therefore, because there are examples of successful collaborations between the two sectors in BC, it is an excellent place to conduct in-depth research to identify specific examples of the intersection of food safety and food security efforts in public health practice, and to explore barriers and facilitators for collaborations between public health practitioners of the food safety and food security sectors.

3. Study Rationale and Contributions

Foodborne disease and food insecurity each affect a large number of Canadians every year. In addition to the impacts they separately exert on the population, there are also many ways that foodborne disease and food insecurity can interact. Despite emerging evidence for the potential interrelationships between their health outcomes, the public health sectors in place to address foodborne disease and food insecurity issues often operate independently of each other. However, BC has recognized the connection between the two public health efforts (BC Health Authorities et al., 2006; Population and Public Health & BC Ministry of Health, 2014), and has examples of successful collaborations between the food safety and food security sectors, such as the amendments to the Meat Inspection Regulations that recognized the importance of scale in food safety regulations (Miewald et al., 2013).

Based on the presence of successful collaborations between the two sectors, BC is an ideal setting to investigate collaborations between the food safety and food security sectors. There is currently limited information on the intersection between these two sectors, and little information available on how public health practitioners of the two sectors work together, with only one study from Canada that examined how actors in the public health system can reduce tensions between the food safety and food security sectors (Martin & Perkin, 2016). Therefore, in order to address this knowledge gap, the overall goal of this thesis was to explore collaborations between the food safety, and food security and healthy eating public health sectors in BC. Specifically, the objectives of this thesis were to:

1. explore ways in which food security efforts (and the food insecurity issues they aim to address) and food safety practices (and the foodborne diseases they aim to address)

may intersect, within the province of BC (Canada) and from the perspective of the individual public health practitioner (Chapter 4); and

2. identify factors that facilitate or inhibit collaborations between practitioners in the two sectors (Chapter 5).

This study was the first explicit exploration of the different ways that the food safety and food security public health efforts, and the health issues they aim to address, intersect with each other. In addition, this was the first study to explore the perspectives of public health practitioners working in these two sectors on factors that facilitate or inhibit collaborations with the other sector. Therefore, taken together, this thesis identified specific areas where better and more collaboration between practitioners of the historically separated food safety and food security public health sectors could be beneficial for improved population health, as well as ways to support these collaborations going forward.

4. "Highly processed, highly packaged, very unhealthy. But they are low risk": exploring intersections between food security and food safety as a factor shaping the food environment

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4.1 Introduction

Food insecurity and foodborne disease are both important population health issues. Each year, approximately 4 million Canadians experience food insecurity (Tarasuk et al., 2014), and over 4 million Canadians develop an infection from the food they eat (Thomas et al., 2013). How these numbers overlap is unknown, because the two issues have historically been considered separately, both in terms of characterizing their impact in the population, as well as by the food security and food safety activities undertaken by public health organizations and policy makers in response.

Food security activities, which aim to ensure that "[…] all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, n.d.), include efforts like programs designed to increase public access to fresh and healthy food (BC Association of Farmers' Markets, 2014). Food safety activities, which aim to reduce the risk of foodborne disease in the population, include those such as legislation and its enforcement (*Safe Food for Canadians Act*,

2012), and outbreak investigations and food recalls (MacDonald et al., 2004; McIntyre et al., 2015). Because these activities are some of "the physical, social, economic, cultural, and political factors that impact the accessibility, availability, and adequacy of food within a community or region" (Rideout, Mah, & Minaker, 2015), they can be considered factors that shape the food environment.

Despite the historical separation of food security and food safety in public health practice, there is evidence that food insecurity and foodborne disease share upstream determinants (Majowicz et al., 2016). There is also evidence that public health actions undertaken to address one of these population health issues can inadvertently impact the other. For example, food security programs aimed at improving access to healthy foods, such as the Farmer's Market Coupon Program (BC Association of Farmers' Market, 2014), increase consumption of fresh produce, which is a leading source of foodborne disease outbreaks (Kozak et al., 2013; Painter et al., 2013). Similarly, the 2004 British Columbia (BC) Meat Inspection Regulations, designed to improve food safety, decreased meat processing capacities in remote communities, ultimately increasing food insecurity (Miewald et al., 2013; Miewald et al., 2015). Taken together, these observations suggest that a key yet under-investigated component of characterizing the Canadian food environment is to understand the ways in which different public health actions, undertaken in areas related to food and health, may actually be interacting including in unexpected ways. Because literature in this area is limited, the objective of this study was to explore ways in which food security efforts (and the food insecurity issues they aim to address) and food safety practices (and the foodborne diseases they aim to address) may intersect, within the province of BC (Canada) and from the perspective of the individual public health practitioner.

4.2 Methods

Key informant interviews were conducted with purposefully sampled individuals

working in public health in BC, who had either a food security or food safety focus, and who had

experience working with practitioners in the other sector. We considered 'food security' to

include both food security and healthy eating practitioners working in public health agencies or

community organizations with an aim to increase the population's access to healthy food, and

'food safety' to include practitioners working in public health agencies with an aim to reduce

foodborne disease in the population. Interviews were conducted as part of a broader study whose

ultimate goal was to identify barriers and facilitators to successful inter-sectoral collaboration. A

semi-structured interview guide, which explored participants' experiences working with the

other sector, was developed, piloted, and revised based on feedback regarding ease of questions

(Appendix A). Ethics approval was obtained from a University of Waterloo Research Ethics

Committee (ORE#20375).

Participants were recruited via email, and all provided verbal informed consent at the

beginning of their telephone interview; interviews were conducted from January to February

2015, and were one to two hours in length. Interviews were audio-recorded and field notes were

also taken. Interviews were transcribed, and transcripts were corrected against the audio-files

(Braun & Clarke, 2006) and anonymized.

Of the 19 individuals invited to participate, 14 agreed, 1 declined and 4 did not respond

within the study timeframe. The 14 participants worked in five of the seven BC health

authorities, three provincial-level government organizations, and two non-governmental

organizations; brought either front-line or management perspectives in the areas of food security

(n=6), food safety (n=5), or both (n=3); and were all mid- to late career. Eight were female and

six were male. To maintain confidentiality of the results herein, participants could only be identified by position/sector, but not also by other characteristics. Food safety practitioners were more easily identified by their position than those working in food security; the majority were environmental health officers, and managers and directors of health protection and environmental health departments. In contrast, food security practitioners were more diverse in their positions, working in areas such as healthy eating and access to local foods, and included community nutritionists and public health dietitians (hereafter called collectively 'dietitians'), and project leads. A more detailed outline of the key informant interview data collection is available in Appendix B.

Qualitative descriptive analysis was conducted to identify and explore examples of intersections between the two sectors as discussed by the participants (Sandelowski, 2000). Analysis was managed in ATLAS.ti version 1.0.50 (282) (ATLAS.ti Scientific Software Development GmbH, 2013-2016). Data were inductively analyzed as per Braun and Clarke (2006). After immersion in the data, examples of intersections were coded and used to develop preliminary themes. Themes were reviewed and revised iteratively, and each theme was then further explored using the specific settings and instances as described by participants. Memos were used throughout the coding process, to revisit questions and reflections regarding the data, as per Birks, Chapman and Francis (2008).

4.3 Results

Participants spoke to four important ways in which food security and food safety intersect within the BC public health context. Namely, they described how the public health practices of these two sectors impacted each other, sometimes in conflicting ways, and how this conflict arose, in part, from historically disjointed policies and regulations that only consider one health

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outcome, as well as because there are specific food types (e.g., fresh produce) that are considered risky or beneficial depending on the public health lens taken. Finally, and despite such issues, participants highlighted that both sectors are working towards the same ultimate goal of improved population health.

The intersection of specific public health practices

Participants described many ways their own public health activities influenced, or were influenced by, the public health efforts of the other sector (Table 4.1), including by describing ways in which this intersection posed a barrier to achieving their particular public health goals. The conflict experienced by food security practitioners was exemplified by the situation of providing traditional, indigenous food in facilities licensed to provide or serve food to the public (e.g., daycares, hospitals, dining facilities). As P11 (dietitian) explained, being able to serve traditional food in public venues is important for food security:

> […] for First Nations food security is so much bigger than just having enough food. Um, it's having culturally acceptable food. It's, um, being able to access and have rights, um, to the lands and waters to source those foods, so, being able to serve them in a, at a conference facility, um, is, it's health promoting in a much bigger picture, social determents of health.

However, efforts to provide traditional foods within licensed facilities were often seen as being impeded by food safety activities, as illustrated by P4 (dietitian), who described how the 'Hazard Analysis Critical Control Points' (HACCP) approach, a food safety activity that aims to ensure the microbial safety of foods by implementing control procedures at important steps during food production, comes into play:

> Well, there is a big issue that arises whenever you're speaking of aboriginal care facilities, whether they're for children, or for seniors, or for people who might be living with disabilities or whatever, and that is that...provision of traditional food is very challenging in those settings, because the settings want to assure safety, and so want to assure that foods have travelled along a HACCP protected path. […] Ah, but traditional foods don't travel along a HACCP protected path. […] So it becomes very challenging,

because if you're an aboriginal senior, and all your life, you've eaten, you know, home canned fish, or fresh caught fish, and you enter a care facility and you want fish, and you get, like, [brand name] frozen fish sticks. […] And yet there are no facilities that have that HACCP protected path, so you can say that this has been safe all the way along its journey, from source to plate [...]

The conflict experienced by food safety practitioners in the course of pursing their daily activities was exemplified by the situation of local farmer's markets, a venue in which food security advocates worked to increase access to local, fresh food. As P3 (environmental health officer) explained, when food security efforts went ahead without considering foodborne disease risks, environmental health officers – who have a legal enforcement role to ensure food sold to the public is safe – were then put in a position where they had to react:

> [The population health group] were putting together, um, a list of local food providers. [...] And, ah, that kind of thing, um, and what happened is they were, you know, charging out there and getting everybody signed up, and getting names and numbers where you can buy, 'whatever,' um, and the problem was, 'whatever' is what was on the list including, um, uninspected meat. [...] Once the meat inspection regulations came in, um, and somebody was cooking, ah, perogies for sale, and somebody else was making, ah, goat cheese out of uninspected milk, and so, some fairly serious public health issues [...] in my mind, and, you know, there was no channel for communication, there was just great ideas and they go out and do them, and without any collaboration or even inquiry with us, so when we get wind of it, it's like, "no, you're done, you can't do that." And, of course, the war's on. (laughing)

The impact of policies that only consider one food-health outcome

When discussing conflict between food security and food safety efforts, participants spoke about how this was, in part, a product of disjointed policies and regulations that historically have not considered other food-health outcomes in their development and implementation. For example, P12 (dietitian) explained how guidelines, like the food safety guidelines followed within BC's FOODSAFE food handler training program (FOODSAFE, 2009), can cause issues for pre-schools who serve food to children:

> Well we, I mean, we've always have an interest our program - the community nutrition program - in doing more work with ah, the pre-school, sort of, population, and encourage,

and promote healthy eating in those, sort of um, areas, those, sort of, facilities, and what we were finding is that, um, the [food safety] regulations were almost working against us. […] on one hand there was licensees, like, the child care providers were hearing a strong, um, "you need to be FOODSAFE," sort of, message, um, to the point where, you know, I believe that if it was in a crinkly package, um, it was- that was good to serve almost, because it was FOODSAFE, um, and then nutrition was coming along with, "well, we want healthy foods, which are fresh foods," and um, and I think they were somewhat bound with what they could do […]

P12 went on to explain that existing food safety regulations often do not consider the impact they could have on healthy eating:

> […] environmental health officers, um, they're bound by the Food Premises Regulation. […] and the actions of the environmental health officers and the licensing officers, as well, and our own documents, um, weren't as supportive as they could be, um, for health eating. […] our food safety requirements for child care providers, for licensed child care facilities were very strongly orientated to food safety, without the consideration of healthy.

In some instances, the policy disconnect was implicit in participants' statements, for example in how P13 (food security lead) described Canada's Food Guide as the ultimate guideline in the province, while dismissing the risk of foodborne disease and the food safety regulations designed to minimize such risk:

> […] basically, Canada's Food Guide is a national guideline. […] For healthy eating in Canada, and provincially we use that as a tool, and we, you know, everybody is implementing working towards healthier food choices. […] So, you can't trump that. You can't, sort of, say, "kids can't eat salads, because they're dangerous." […] You can't ban hamburger from pre-schools, right, (laughing) because they have a risk of *E. coli*...whatever.

Beyond the regulations and guidelines themselves, some participants discussed how different interpretations of food safety regulations can negatively impact food security and healthy eating, as illustrated by P6 (manager, health protection/environmental health):

> And I think that, you know, for a lot of people, it's, yea, the light bulb comes on, " oh yea, this makes sense, it's not really that big a deal, let them just go at it," ah, and then there's other people saying, "well, no, it doesn't meet the letter of the law," so, for some staff, it really depends on their own personal perspective as to how they read the

legislation and how much they feel they have that discretion to work around, kind of, the letter of the law, to do what probably is the right thing to do.

Participants also described how reinterpreting existing regulations can help mutually support both food safety and food security goals. For example, P12 (dietitian) pointed out that the 2007 Child Care Licensing Regulation (*Community Care and Assisted Living Act: Child Care Licensing Regulation*, 2007) actually supports both food security and food safety in child care centres:

> […] where I think we got some buy in, as well, through, um, the health protection - was that, um, doing those, sort of, food activities, um, with children, would actually meet some of the, sort of the Child Care Licensing Regulation, um, statements or requirements. Um, because we looked at the Child Care Licensing Regulation, it states um - where is it - "a licensee must establish a program to instruct and practice the rules of health and hygiene." That's actually Section 46... (laughing) …of the Child Care Licensing Regulations. So, um, you know, we argued that providing food exploration and preparation experiences are ideal hands-on opportunities to teach children about hygiene, health, food safety and hand washing. Um, so, that was one argument, and then, um, also, there's a whole Section 48, um, Nutrition and Child Care Licensing Regulation that states that a child- "that a licensee must ensure that each child has healthy food and drink according to Canada Food Guide," and a whole bunch of stuff, right, and so, and then we argued that best practice is to expose children to a variety of healthy foods and food experiences, that are fresh and minimally processed, and um, that child care providers, that they were, um, confined to prepackaged, sort of, foods to avoid the approval process. They were going to be compromising nutritional quality. Nutritional quality was, like, a big piece of the Child Care Licensing Regulation, so, yea, for those two reasons, like a, in the Child Care Licensing Regulation, we kind of flipped it around and said, um, you know, "these changes actually help you meet regulations."

P6 (manager, health protection/environmental health) also spoke to re-interpretation, when discussing guidelines that had been developed to interpret food safety legislation in a way that also supports specific food security and healthy eating initiatives:

> And I think that, really what I see in a lot of these, kind of, food security initiatives is that the staff kind of need the permission to go ahead and consider these things, um, so there's a couple things that come to mind, is that, um, yea, they want to know that they're not going to get in trouble for approving something that they maybe shouldn't have approved if they were following the letter of the law, um, but also that there's some consistency in that, you know, if you're giving somebody an opportunity to do something like this, you may be perceived as being a bit soft, in the legislation, ah, but if it's, you know, if there's

a guideline to support it, or if there's some other, ah, documentation that says, you know, if some precedent was set, "yea, you can allow this and this and this in this type of facility," then that, kind of, gives them that permission to go ahead and allow that softening of that hard interpretation of the legislation.

The impact of the food product: what's healthy isn't always safe, and what's safe isn't always

healthy

Much of the conflict that participants described at the practical and policy levels was

related to the fact that the risk of foodborne disease can be higher with the types of fresh and

healthy foods that food security efforts aim to promote, and that foods with a low food safety risk

are often prepackaged and processed, and thus less healthy and nutritious.   Participants

predominantly talked about fresh fruits and vegetables, versus prepackaged and processed foods

or foods that are "[…] in a crinkly package […]" (P12, dietitian). For example, P6 (manager,

health protection/environmental health) compared produce versus Kraft Dinner when discussing

food donations to places like food banks, describing the risks of these two types of foods:

> […] we consider produce quite often now as one of the riskier foods [...] just based on the number of outbreaks that have occurred in the last decade or so, ah, often produce is going to be implicated in outbreak, and certainly this is one of the food types that you'd want to see in a, um, a soup bank or a food kitchen – or, sorry, a soup kitchen or food bank – ah, or available for donation, ah, healthier food products obviously than, you know, the Kraft Dinner […] model, ah, so I think that, um, you know, we have to take that into consideration, that there are some handling precautions that need to be taken, and there are some limitations on what can be done safely and what can't be done, so, those have to be considered as well.

Likewise, P10 (dietitian) illustrated that foods that minimize foodborne disease risk are often not

considered healthy:

> […] and looking at this one document that used to be in place – well, I think it might still be, because this initiative isn't finalized yet - of this list of, you know, "these are the safe foods that you can do in school." I think we actually might still have a Health Link BC document on FOODSAFE that says "oh, baked goods, you know, high in sugar, or something like that, are safer than doing something like vegetables."

While the idea of fresh produce versus prepackaged foods predominated, other specific types of

foods were mentioned in the context of the intersection between food safety and food security.

For example, P6 (manager, health protection/environmental health) described how potentially

hazardous foods from a food safety perspective, such as meat, dairy, and eggs, are also some of

the more nutritious foods:

> You know, unfortunately, the legislation really doesn't, um... speak to any one specific type of food, um, you know, it talks about potentially hazardous foods a little bit, um, so that has historically been a bit of a cutoff, and unfortunately, a lot of potentially hazardous foods are also some of the more nutritious foods as well, so [...] you've got dairy products, and when you've got some meat products, and eggs, and things like that, um, you know, there's a higher level of risk, ah, generally associated with them, but, ah, you know, that's if there's improper handling along the way.

Similarly, P11 (dietitian) discussed how foods that are beneficial from a food security

perspective, such as community-prepared traditional foods, may be risky from a foodborne

disease perspective:

> […] that understanding from a First Nations perspective as well, that, um, you know, our environment really has changed, and there's a lot more, um, potential for foodborne illness than there, you know, ever was before, um, and our methods are changing a bit as well, so, um, which increases that potential for foodborne illness, like, when you think of, you know, fish or wild game, some people like to um - well fish in particular, people, um, have taken to canning, or jarring fish. […] And, um, it's super common in First Nations communities to do that with the boiling water bath, which is not the, um, it's not the food safe standard for processing. Um, the standard is, um, is pressure canning, um, and the reason is the temperature that you can bring it to [...] you want it to kill potential spores, right, that are going to, you know, the risk is actually death […]

In addition to the above examples, one participant (P13, food security lead) did describe a

situation where the food security and food safety goals of reducing health risks aligned within a

food product, when discussing the issue of expired infant formulas:

> […] with infant formulas and baby foods, the 'best before dates' and um, I just, I was quite concerned about the rancidity [...] in the formulas, and, of course, that can be a food safety discussion, but it's also a very important nutrition discussion, right [...] because of the, um, long-chain, um, essential fatty acids, if they're going rancid you're really

causing a problem. […] That's also a really important nutrition issue. So, rancidity is not just a, kind of, a toxicity piece it's a nutrition component […]

The recognition that, for both sectors, "the ultimate goal is the best health possible"

Overall, participants spoke to the importance of thinking broadly about food's link with population health. For example, P6 (manager, health protection/environmental health) explained that when working towards improved health for the population, it is important to look beyond your own sector to recognize the role of other food-health outcomes:

> Ah, but I think there is ah, some understanding that um, there's more to food than just the food safety side of things, there's a lot more to it in terms of the public health benefits, and I think if you look at the determinants of health, and anybody that's done any work in that area, ah, clearly sees that food safety is one portion of it, but there's many other portions, ah, and many other aspects of food that ah, will influence the ah, you know, a beneficial public health outcome, so, whether it's nutrition, whether it's food security, um, there's other things that happen with food that we have to be cognizant of.

In addition, as P4 (dietitian) noted, food plays a bigger role in health than just the physical act of food consumption: "And that's, sort of, the local people that I work with, that we all work together, and they've heard me expound on, (laughing) you know, those types of issues, that food isn't just food, it's culture, and (laughing) ah, you know, it goes beyond satiety."

Specific to food security and food safety, and despite describing how activities and policies in these areas can be at odds, most participants recognized that both sectors play an important role in improving population health. For example, P1 (food safety expert) noted that both sectors value food safety's health outcome, stating: "[…] in most cases, um, you know, they want to see the same things that you want to see, you know, in terms of, you know, just safe food, I mean, um, you know, no one wants to go out, and make anybody sick." Likewise, P10 (dietitian) pointed out that one of the goals of food security is to instill long-term healthy habits in the population, and that food safety often is incorporated into this goal: "[…] well, both in terms of child care and school settings - it's when children are, um, learning eating habits that

will hopefully serve as a foundation throughout their life. So we want both healthy and safe food, in those cases." In addition, participants recognized that food safety is often considered an important component of food security, as illustrated by P1 (food safety expert):

> […] the whole idea of food security, you know, good, nutritious food for everybody, or access to it, um, but, you know, good nutritious, you know, safe food. […] Ah, it's, to me it's, really it's definitely connected to our very, you know, very, ah, central theme, you know, just as important as the nutrition.

Finally, participants expressed the idea that the ultimate goal of both the food security and food safety sectors is to improve the health of the population, as described by P12 (dietitian) when discussing food in childcare settings:

> […] the take home message that we're trying to make is like the ultimate goal is the best health possible for children in care. It includes immediate health and safety, as well as lifelong health, and, like, keeping in mind about, you know, how the effect of chronic disease, and the percent of population that's going to be affected by chronic disease, um, due to poor eating habits and lifestyle, um, versus, you know, that, the immediate food safety risk. […] And in trying to balance them, because they're both really important […]

4.4 Discussion

This study investigated ways in which food security and food safety intersect, in the context of public health practice in BC. Participants spoke to ways in which their daily practices, aimed at improving either the population's access to healthy food, or the safety of food consumed by the public, could be helped or hindered by the activities of the other sector, in part due to historically disjointed policies that do not consider multiple health outcomes related to food. Participants also identified how specific types of food products, such as fresh produce, can be considered either risky or beneficial to the population's health, depending on one's perspective. Despite these tensions, participants recognized that both sectors are working towards the same overall goal of improved population health, albeit using slightly different lenses.

This study is the first to explicitly explore the range of ways that public health practices in the areas of food security and food safety, and the health outcomes they aim to address, can intersect, either synergistically and detrimentally. Previous research has focused on assessing inclusion of food safety within food security initiatives (Dollahite et al., 2014), and the impacts of a particular food safety regulation on population food security (Miewald et al., 2013; Miewald et al., 2015), as well as exploring risk factors that can be common to both food insecurity and foodborne disease (e.g., socioeconomic status; Gillespie et al., 2010; climate change; Ahdoot et al., 2015). This study adds to our understanding by illustrating how public health activities in both the food security and food safety sectors influence each other, and can work synergistically or detrimentally to influence the types of foods that may be available in different settings. As well, by illustrating how particular foods have both health risks and benefits, depending on the public health perspective taken, this study also highlights the need for a more integrated approach to food policy, that considers impacts for overall population heath, rather than food security, healthy eating, or food safety alone.

This study also illustrates, via examples from the BC context, two issues at play across the Canadian food system, namely the historical 'silo-ing' of food safety and food security that has occurred in public health practice, and the relatively greater level of institutionalization of the food safety function of public health versus the food security function. Here, food safety practitioners had more clearly defined positions, including the certified position of Environmental Health Officer (Canadian Institute of Public Health Inspectors, 2016), whereas food security practitioners were more diverse and often had roles of community nutritionists and public health dietitians. Food safety practitioners were found solely in government and health authority organizations, whereas food security practitioners were also found in community and

non-governmental organizations. This may be important when considering future community-engaged food initiatives, because community organizations may not represent nor advocate for addressing the actual foodborne risks faced by Canadians. Participants also discussed the legislation, regulations and policies associated with food safety much more clearly than those associated with food security, in part because food safety legislation has long existed in Canada (e.g., Canada's 1920 Food and Drugs Act; *Food and Drugs Act*, 1985), compared to the relatively newly developed food security-related legislation (e.g., BC's Local Food Act; *Bill M 222 – 2015: British Columbia Local Food Act*, 2015). The role that the combined legislative and regulatory environment plays in improving healthy eating habits and diet quality in the Canadian population bears investigating, particularly as efforts to integrate across food security and food safety increase and become more explicit (PHSA, 2009).

Strengths and Limitations

Because of the paucity of literature, conducting key informant interviews allowed for an in-depth exploration of the various ways that the food security and food safety sectors might intersect, as experienced by public health practitioners in BC. This important first assessment revealed several important areas to consider when characterizing the food environment, and can guide future, more comprehensive assessments of a wider range of practitioners and provinces. The main limitation of this study is that we targeted practitioners who had experience working with the other sector; it is possible that their experiences are different than other practitioners (who have either not worked with the other sector, or who have tried but not succeeded), and future studies exploring experiences of other practitioners are needed. Nevertheless, this study uncovered important areas for consideration when conceptualizing how public health activities and policies can shape Canada's food environment.

4.5 Conclusion

This study highlights how food security and food safety, two important but historically separated public health sectors in Canada, are actually connected in several ways. It therefore behooves practitioners in these areas to work more collaboratively, in particular to mitigate any unintended population health consequences, and future research to identify ways to support such collaboration is needed. Even beyond food security and food safety, these findings suggest the need to consider how various public health actions related to food and health may intersect in unexpected ways to shape the current food environment, highlighting the importance of engaging across units within and across public health organizations when designing new programs or policies aimed at changing the way Canadians eat.

Table 4.1   Situations experienced by participants in which public health efforts within the areas of food security and food safety intersected or were interconnected

Situation	Example quote
Providing local, fresh, and healthy food in schools	So, with the environmental health officers, sort of, perspective, it's very much about – well, their role is food safety - so often the foods that are safe – safer - are often packaged, um, foods, and processed foods, which don't always align with some of the foods that we're trying to promote with schools. [P10, dietitian]
Providing healthy food in child care centres	[…] you can get this list of low risk foods […] highly packaged, right, highly processed, highly packaged, very unhealthy. But they are low risk, so, if you have, if you - you can really bump up against, like, say if you're working with a pre-school, a pre-school, day care setting, and you want them to have healthy foods for kids, but, um, you know, you're coming in with the wrong guidelines when you just say, "you can't have those foods." […] You've got to say, "you've got to show us how you cook foods properly." [P13, food security lead]
Providing local food in hospitals	[…] there's the ah, discussion about um, local food provision in hospital kitchens because it's a big buyer of food, and ah, the discussion, "well, maybe we can get the local meat supplier to supply the meats for, you know, for the products that they're serving in the hospital, that would be a great market for them to get into," and then you start to think about, "well, do they really have the infrastructure to be able to support that,

	um, on a consistent basis, and can they do it safely?" […] You know, I think that, that that's um, one of the arguments ah, against um, local provision of food, is that the hospitals need a large volume of very uniform food that doesn't need a lot of processing […] safety is another thing, you know, do they have the mechanisms in place, you know, you think a produce supplier, do they have the, um, on farm food safety, um, ah, aspects, are they following the GAP [Good Agricultural Practices] processes, and ah, um, do they have that infrastructure in place to be able to um, produce the ah, the reassurance I guess, or the quality of the food, and reassure the, ah, the users of that, that it's of sufficiently high quality that, um, they don't have to worry about a food safety risk ah, when they accept it at the back door of the hospital. [P6, manager, health protection/environmental health]
Providing local food at farmers markets	[…] We weren't happy with hazardous foods at the farmers market and ah, um, we wanted some labeling happening on, um, canned goods, and, you know, this kind of thing that wasn't part of what [the food security/population health group] were doing. They were just pushing to get some local food out. [P3, environmental health officer]
Promoting community gardens	[…] I mean I would use community gardens right now, they're, doing, you know, the study out of UBC [the University of British Columbia]. You've probably read it, you know, um, around, soil contamination and lead, high lead levels in some Vancouver community garden areas. So, of course that's a huge concern. We don't want people to get lead

	poisoning, and, but if we don't have that conversation from the food security perspective, maybe it just gets all shut down and there's no more community gardens in the City of Vancouver, well, that's not, you know, that's not good […] [P7, manager, food security]
Supporting access to local food and agriculture	[…] but people just, um, you know, I guess what it was, "well, if it was just grown across the street, and it's just a little one acre farm, then it has to be good for us," attitude, and from the agriculture side, you know, it does sound wonderful, and it could be just awesome, but it could be not, and we just couldn't take that risk, feeding somebody else's children. [P9, food security project lead]
Establishing food safety through local meat regulations	[…] there was a recognition that in some of our more rural remote locations, um, it wasn't feasible to actually, ah, create a provincially licensed abattoir, so they, um, introduced an on-farm slaughter license, and we have Class D and E licenses available in those rural remote locations, and we also have Class E licenses that are available outside of those locations, um, with the feasibility study, and the reason being because if you can take your animal to an abattoir, we would prefer it, because of the food safety standards that are in the abattoir. […] Um...so that was, kind of a response, recognizing that we wanted to continue to support local food, but yet we wanted to have standards in place. Um, because we do, obviously, want to ensure that all British Columbians have access for safe local meat, right. [P8, manager, health protection/environmental health]

Food donations to food banks and through community kitchens	[…] we consider produce quite often now as one of the riskier foods [...] just based on the number of outbreaks that have occurred in the last decade or so, ah, often produce is going to be implicated in outbreak, and certainly this is one of the food types that you'd want to see in a, um, a soup bank or a food kitchen – or, sorry, a soup kitchen or food bank – ah, or available for donation, ah, healthier food products obviously than, you know, the Kraft Dinner [...] model, ah, so I think that, um, you know, we have to take that into consideration, that there are some handling precautions that need to be taken, and there are some limitations on what can be done safely and what can't be done, so, those have to be considered as well. [P6, manager, health protection/environmental health]
Supporting use of culled game meat	Um, you know, say with the culled game meat, I mean we were getting requests from, you know, these municipalities or regional districts, saying, "hey, you know, we're having all these deers killed, and, you know, wouldn't it be nice if, you know, we could somehow process and donate the food to, you know, the local food bank, or First Nations folks or, you know, whoever," and um, and we're like, "well yea that would be a good idea because it's, you know, it's high quality food, um, so let's, kind of work together and make sure that it's done safely. So, that, you know, they don't get sick when they eat the food." [P1, food safety expert]
Supporting access	[…] community nutrition programs have gleaning ah, project, um, in the

to local, healthy food donations through gleaning projects	[region name], there's a big, of course, a lot of tree fruits there that are ah, left over at the end of the year, um, so we've worked with them on providing some food safety tips along the gleaning um, project side of things. [P6, manager, health protection/environmental health]
Improving the health of new mothers and young children	[…] there's a lot of ah, clinics being held ah, in public health these days ah, related to ah, breast feeding in young mothers, and ah – or, you know, new mothers, sorry - and ah, you know, there's - we're bringing in other groups in there to talk about food safety with them, to disinfection, to talk about personal hygiene in the home, and, you know, especially with a lot of pets, and toys and any of the ah, infections that can occur in the home, how to avoid them, and so it brought infection control in there, it brought the ah, food safety ah, people in there, it brought the food security people in there, it brought ah, the ah, healthy eating people in there, so, there's, you know, there's a wide variety, ah. [P5, environmental health officer]

5. "They hold on tight to the healthy eating, we hold on tight to our food safety, and how do we bridge that": exploring factors influencing the success of collaborations between food safety and food security practitioners in British Columbia, Canada

Written and formatted for submission to *Food Policy*

5.1 Introduction

Foodborne disease and food insecurity are both important public health issues in Canada, each individually impacting circa 1 in 8 Canadians annually (Tarasuk et al., 2014; Thomas et al., 2013). There are many upstream drivers that influence both foodborne disease and food insecurity, such as socioeconomic status and climate change (Majowicz et al., 2016). In addition, the two health issues often conflict within specific food products, as foods that are considered low risk in terms of foodborne disease (such as processed and packaged foods) are often not the foods that are beneficial for food security, and healthy foods that are important for food security (like fresh produce) are often considered higher risk in terms of foodborne disease (Chapter 4).   However, despite the emerging recognition of the intersection between the two health issues, they are most often addressed separately within the public health realm, as outlined below.

Food Safety

In British Columbia (BC), Canada's third largest province (population 4.75 million; Statistics Canada, 2016), an estimated 1.3 cases of acute gastrointestinal illness (a common

symptom profile of foodborne disease) occur per person-year (Thomas et al., 2006), costing an average of $113.70 per case (Henson et al., 2008; Henson et al., 2011). To address foodborne disease, governments in Canada (as in other countries) aim to reduce illnesses through food safety efforts, including enforcement of food safety legislation (e.g., *Safe Food for Canadians Act,* 2012), and outbreak investigations and food recalls (e.g., MacDonald et al., 2004; McIntyre et al., 2015; M. Taylor et al., 2012).

Food Security

Alongside food safety issues, an estimated 12.7% of BC households experienced food insecurity (circa 2012; Tarasuk et al., 2014). Average annual health care costs were $235 higher for marginally food insecure households, $455 higher for moderately food insecure households, and $1092 higher for severely food insecure households compared to food secure households (Tarasuk, Cheng et al., 2015). However, food security can be viewed at different levels, including at the household, community, or national levels (Tarasuk, 2001). To increase the population's access to healthy foods, governments in Canada provide support and resources for community-led food security efforts, such as community programs like food banks (e.g., Ford et al., 2013), and coupon programs designed to make healthy food more affordable (e.g., BC Association of Farmers' Markets, 2014) that address community-level resources. Governments in Canada can influence food security at the household level more directly by setting minimum wage standards (Government of British Columbia, n.d.[d]).

However, addressing foodborne disease and food insecurity separately can be problematic because food safety and food security efforts often intersect in daily public health practice, and can create unintended negative consequences for the health outcome of the other sector (Chapter 4). For example, increasing access to fresh produce through food security efforts

may negatively affect food safety outcomes, as produce has been associated with foodborne disease outbreaks (Kozak et al., 2013; Painter et al., 2013; Shah et al., 2009). Policies and legislation that only consider one food and health outcome can also negatively impact the other sector's outcome (Chapter 4). For example, the Meat Inspection Regulations developed in BC to ensure safe meat production reduced the ability of remote communities to produce their own meat, and therefore impacted their food security (Miewald et al., 2013; Miewald et al., 2015). In addition to the potential conflict that can occur between the two public health sectors, it is also important to note that they are both working towards the same ultimate goal of improved population health (Chapter 4); therefore, it is important for practitioners of the two sectors to work together.

Efforts to formally integrate food safety and food security, both organizationally and within public health activities, are beginning to emerge, as follows. In 2014, the World Health Organization explicitly acknowledged the importance of such collaboration to ensure healthy and safe diets (Chan, 2014). At the activity level, food safety has been explicitly included in food security initiatives, by including food safety in nutrition education curriculums (e.g., Dollahite et al., 2014), and addressing contaminated soil in urban agriculture (e.g., Angotti, 2015; Kaiser et al., 2015). In 2005, the province of BC made changes to their public health system by organizing health services into core programs, two of which are food safety and food security (Population Health and Wellness, Ministry of Health Services, & Province of British Columbia, 2005). Both of these programs acknowledge the importance of addressing the other sector within their initiatives (BC Health Authorities et al., 2006; Population and Public Health & BC Ministry of Health, 2014). Within activities, examples of this integration include food safety

guidelines designed for specific food security initiatives (e.g., Temporary Food Markets: Guideline for the Sale of Foods at Temporary Markets; BCCDC, 2014).

Despite the emerging recognition of the connections between food safety and food security public health efforts, there is limited research on how to support collaborations between the two sectors. Martin and Perkin (2016) explored how to reduce existing tensions between the two sectors in the Canadian context, finding that "communicating," "understanding intent," "educating," "understanding risk and regulations," "recognizing scale," and "enhancing partnerships" are key components in reducing tensions. However, identifying factors at play in successful collaborations between the sectors is also needed. Therefore, the objective of the present study was to identify factors that facilitate or are barriers to past or current collaboration between food safety and food security practitioners in B.C, Canada.

5.2 Methods

A detailed description of the data collection process was outlined elsewhere (Chapter 4; Appendix B), and is briefly summarized here. Key informant interviews were conducted with purposefully sampled individuals working in public health in BC, who had either a food safety or food security focus, and who had experience working with practitioners in the other sector. We considered 'food safety' to include practitioners working in public health agencies with an aim to reduce foodborne disease in the population, and 'food security' to include both food security and healthy eating practitioners working in public health agencies or community organizations with an aim to increase the population's access to healthy food. In total, 14 key informant interviews were conducted, 1 potential participant declined to participate, and 4 potential participants did not respond within the study timeframe. Key informant interviews were conducted with five public health practitioners working in the food safety sector, six public health practitioners

working in the food security sector, and three public health practitioners who brought both perspectives. The practitioners included in the study were all mid- to late career, and represented five of the seven BC health authorities, three provincial-level government organizations, and two non-governmental organizations. Eight of the participants were female, and six of the participants were male. To maintain confidentiality of the results herein, participants could only be identified by position/sector, but not also by other characteristics. The food safety practitioners included in this study were environmental health officers, and managers and directors of health protection and environmental health departments. The food security practitioners were more diverse in their positions, working in areas such as healthy eating and access to local foods, and included community nutritionists and public health dietitians (hereafter called collectively 'dietitians'), and project leads.

The semi-structured interview guide (Appendix A) was developed to explore participants' perspectives on collaborations between the two sectors in the province in BC, specifically to identify factors that participants believed impacted the success of these collaborations. Prior to data collection, a University of Waterloo Research Ethics Committee provided ethics approval for the study (ORE#20375), and all of the participants provided verbal informed consent before the interview started. The interviews, which ranged in length from one to two hours, were conducted in January and February 2015. The interviews were audio-recorded, and then transcribed. The accuracy of each transcript was verified against the audio-files (Braun & Clarke, 2006), and the transcripts were anonymized. Field notes were also taken during the interviews.

Data were inductively analyzed using the processes outlined by DeCuir-Gunby, Marshall and McCulloch (2011) and Braun and Clarke (2006), to identify factors that were facilitators or

barriers to collaborations between practitioners of the two sectors, as follows. Data were

managed in ATLAS.ti version 1.0.50 (282) (ATLAS.ti Scientific Software Development GmbH,

2013-2016). A list of initial codes was developed through open coding, to identify key words

and sections of the text that were relevant to understanding the facilitators and barriers to

successful collaboration between practitioners of the two sectors, following immersion in the

data. The initial codes were revised based on an inductive analysis of 7 of the 14 transcripts.

These initial codes were then compiled into a draft codebook containing the name and detailed

description of the code. Two individuals with graduate-level qualitative research training then

separately coded three transcripts, and selected quotes that they felt exemplified each code. Any

disagreements in coding were used to refine the definitions of the codes, and to create new codes.

The codebook was iteratively revised while coding all 14 transcripts, by refining existing codes

and adding codes as they developed. Four of the researchers involved in the study met to

provide input on the coding process and the codebook development, and the codes and their

definitions were then revised. The codes were then arranged into themes. The data were

revisited to ensure the accuracy of the analysis and refined as required. Memos were written

throughout the coding process as outlined by Birks et al. (2008) to track questions and reflections

regarding the data. A more detailed description of the analysis for this chapter is available in

Appendix C.

5.3 Results

Participants identified many factors that they saw as playing a role in the success of

collaborations between practitioners of the food safety and food security sectors. While the

focus of this study was on collaborations between food safety and food security practitioners,

communicating with the public and creating common messaging for the public were often

considered incentives for collaboration, and individuals of the public could be included as

stakeholders within collaborations; therefore, communicating with the public is included in the

following results. In addition, when discussing food security initiatives with food safety

practitioners, they often considered food industry operators as people who they needed to work

with to ensure the public's access to local, healthy food; thus, food industry operators are also

included in the following results. All of the factors except one were discussed as both a

facilitator and a barrier, depending on how the factor occurred in each specific circumstance.

The majority of these factors were considered a facilitator for collaboration when they were

present, and a barrier to collaboration when they were absent. A smaller number of factors were

characterized as facilitators by some participants, and as barriers by other participants.

Therefore, the majority of factors are presented below as both facilitators and barriers.

Personal connections with those in the other sector, and to those who have already successfully

collaborated

All participants, regardless of their sector, discussed how being individually connected to

practitioners working in the other sector facilitated collaborations between the sectors:

> Well I think the informality builds over time, as, you know, just, as you and your co-
> workers come to know what each other do, through, you know, ongoing exposure, and
> so, the informality is in part because of the co-location, but also in part just because you
> guys are all working together, you're just a group of humans all interacting in the same
> space, day in and day out. [P11, dietitian]

Establishing personal connections promoted trust between the sectors, which also facilitated

collaboration: "The relationship between us has to be very strong, and we have to trust each

other, so that they trust us, that we know what we're doing now" [P6, food security project lead].

Personal connections and relationships were also seen as facilitators because they enabled

problem solving, particularly around any potential inter-sector conflicts that may arise: "[…] that

relationship has to exist, and with that comes a willingness to explore the situation, and come to a solution" [P4, dietitian]. Personal connections and individual relationships with practitioners in the other sector also facilitated future, larger collaborations, as P9 (manager, health protection/environmental health) explained:

> […] I just think of another note I got, ah, today somebody is doing a local, um, newsletter in their community, and the local nutritionist said "hey [P9], can you maybe just scan this quick for, you know, a little bit of, ah, you know, food safety, kind of, background, and see if there's some missing information or erroneous information" so, you know, just five minutes I had a look at it, I had a couple suggestions, fired it back, and it's just the, that day-to-day interaction, ah, with those programs to have the lines of communication open, and, you know, getting opinions back and forth, um, really goes a long way to, kind of, fostering that working relationship, but leads to having, um, kind of, bigger things end up on the plate eventually […] you start to have that working relationship expand a little bit into something like that [project name], where you've got a pretty substantial project that you're working on together.

Personally connecting with practitioners who had already successfully collaborated with the other sector, or who had unsuccessfully attempted to do so, was also a seen as facilitator, because it allowed for sharing of examples and dialogue around what worked and what did not in different contexts. It also allowed practitioners to identify options to overcome problems, because "[…] everybody's gone through growing pains with various things, and share the growing pains, or share the stumbling blocks before somebody else stumbles on it." [P6, food security project lead]. Connecting with those who had successfully collaborated also helped individuals figure out how others had done similar projects. For example, P4 (dietitian) described how facilities who were looking to offer traditional indigenous food to their patients were contacting a facility that had already successfully incorporated traditional food into their menu: "Um, so each [facility] is doing their own, kind of, exploration on how to address it, and every one of them is phoning that [facility name], and asking them how they did it."

When working on a particular collaboration, those in both sectors saw connecting with individuals in the other sector early, and throughout the process, as a facilitator. As P14 (food safety expert) explained, there are benefits of engaging with those working in food security early in the collaborative process:

> […] as early as you can, as early as you can recognize that there's something new that's come along here, to, for the, to get the various stakeholders together, um, as early as you can, and get people talking, so that if there is a need for some guideline or some, um, you know, some guidance documents, um, then, you know, you get people, sort of, together early on, um, and I just, I found this from my experience that the earlier you can get people talking, um, the, usually the, you know, you're going to end up with a lot better results ah, in terms of - not just finished product, but just how, um, ah, you know, the different sides, sort of have or maintain their relationships.

P9 (manager, health protection/environmental health) also discussed how engagement with the other sector needed to be ongoing:

> […] you would want to see something that's on an ongoing basis, um, to really build that, um, over the longer term, and I think that, yea, you might pick up some ideas, ah, in, you know, the two day conference or something like that, but um, ah, to really build on that momentum, ah, you'd want to make sure you've got something on an ongoing basis, ah, regular meetings of the working group kind of thing.

Not being personally connected with those in the other sector was seen as a barrier, because it did not allow conflicts to be addressed proactively, which could result in greater tension between the two sectors. For example, P14 (food safety expert) explained that if practitioners were too far along a project before they contacted practitioners of the other sector, it might be too late to successfully collaborate, because positions were already entrenched:

> Um, it's just better to try to avoid those sorts of situations, um, and get folks together before people start to get, you know, their backs up, or get their positions entrenched or, you know, whatever it is that um, you know, that might act as a deterrent to being able to come to a, you know, a middle ground where everybody is going to get what they want, or get the outcome that they want.

Within individual connections between practitioners, participants discussed that the people behind the position, rather than the position itself, impacted the success of collaborations.

For example, P7 (manager, health protection/environmental health) explained that "[…]

sometimes you just get difficult people […]", and the same project could be successful or

unsuccessful depending on the people involved:

> It was really received different from different people. That's what I mean, it's really
> personality based, so even within, like, the community of food security, there was some,
> you know, there was people who didn't want to involve environmental health, and there
> was people from environmental health who didn't want to be part of food security, and
> then there was people who are, you know, who are great, and said "let's all work
> together." So, in some- like I think that's what's so difficult about the, this situation, is
> that it really is, sometimes it's the individual, not the way they work, (laughing) not even
> their belief.

Purposeful engagement with different types of people who bring value

All 14 participants identified that who is involved in a collaboration is an important factor

that contributes to the success of the collaboration. When considering who to involve in the

collaboration, participants identified that it is "[…] crucial to have input from everyone" [P3,

dietitian], referring to the different types of people who will be impacted by, or involved in, the

work of the collaboration. The different types of people identified by participants were:

practitioners from both the food safety and food security sectors (including from both sectors

within a given organization); individuals from different positions within an organization (e.g.,

front line practitioners, management); and people from different organizations within the

province. For example, P7 (manager, health protection/environmental health) explained how

involving food safety practitioners in a food security initiative, aimed at getting local fresh

produce into schools, could lead to a more successful outcome: "So, "we hear you, that you think

it's, food safety's an issue, this is how we're going to address it. Is this okay with you? Would

you, you know, think of anything else?" So, you have a conduit of being able to identify issues

and solutions in a very pro-active way." P5 (dietitian), who had experience with healthy eating

messages for schools, discussed the potential negative consequences that can occur when

practitioners work separately from the other sector, when they described what happened when

environmental health officers (EHOs) went into schools with messages about what foods present

the smallest foodborne disease risk:

> […] when they heard that the EHOs were going to come in and speak to them, they said, " oh, well you should actually, you know, work with [P5]," and the response, initially, from the EHOs was, "no, no, no, we don't- we want to, you know, keep the message simple and just go in," and they went in and kept it simple, and then it, kind of, blew up huge. So, um, that way, they recognized that, yes, you know what, we need to work together […]

P3 (dietitian) described that managers and front-line workers bring different, but equally

important, value to a collaboration, with managers having the authority to make decisions, and

front-line workers having an in-depth understanding of the realities in practice:

> You know, in the end, like our [group] did expand to include, um, I guess it's the [senior title], and, you know, it was great having [them] at our meetings, because [they], you know, had that higher level influence, could make decisions on the spot, right, for which way something would go, but often times in the conversation, [they] would defer to [their] front line staff, which was a licensing officer, right. Certain things that [they] would just be too far removed from to really answer and have, you know, [they] would rely on information provided by that person to make a decision. So, yea, I think you do need both.

Specifically, including food safety practitioners who "could make decisions on the spot" helped

collaborations move along more smoothly, as P3 explained when discussing the importance of

having a food safety manager represented in a collaboration:

> […] like we would have to, like, refer to [them] anyway, like when [they weren't] on the [group] to begin with, we would, like, you know, have ideas, and suggestions, and, you know, think we were on the right track, but then we'd always have to check with [them] anyway, so like why not just have the person who can, you know, make the decision there. It just did go a lot faster.

Involving multiple people from the same position was also identified as a facilitator, to ensure

that the acceptability of the end result is more than just one practitioner's personal opinion. For

example, P3 (dietitian) explained that practitioners involved in cross-sector collaborations need

to verify with their colleagues that they "[…] were on the right track […]":

> You're on this [group], but the information needs to go back to try to get a sense of, "yea, this is going in the right direction," because sometimes it's just one person's opinion, right... […] one worker, and you think that's a good idea, but you have to poll your other, you know, twenty colleagues, who may be like, "mmm, I don't know. Have you considered this," kind of thing, and then they could come back and, you know, bring that to the group.

> Involving participants who "[…] really understand their scope of practice […]" [P2, food

security lead] was identified as valuable for collaborations. This was not restricted to involving

practitioners of the other sector who had an in-depth understanding of their scope of practice, but

could also include ensuring that one's own scope of practice was well-understood, or talking to

experts in one's own field. For example, when EHOs visited abattoirs to help them understand

how changes in the food safety regulations affected those businesses, P1 (food security expert)

expressed how helpful it was to have someone present who really understood the regulations:

> One [person] in particular was stunning. [They were] amazing. [They were] very knowledgeable, and [they were] really good with people. [They] never compromised the intent of the regulation, um, but [they] also definitely [were], ah, [they were] knowledgeable enough, and there to help the operator to make it work for them. So that was really helpful.

P1 also outlined potential consequences of working with EHOs who did not have as detailed an

understanding of their own practice:

> And I think sometimes when the inspector is not super confident of their knowledge base, a) they can't think outside the box and recognize that their- the outcome was achieved, and/or b) they might feel sufficiently threatened, um, by that lack of knowledge to be more, sort of, hard nosed in how they enforce their inspection.

> Engaging with practitioners who felt a sense of need to address the issue or undertake the

work was also identified as a facilitator to collaboration between the sectors, in that practitioners

might not engage if they did not feel a sense of need to address the issue, as illustrated by P14

(food safety expert):

> Um, there has to be a sense of - um, I don't want to say, what am I trying to say here - there has to be a sense of need by everyone, by all the stakeholders, that this needs to be done. I mean maybe it hasn't reached a crisis point or anything like that, but it's like, there's a need here, we need to get this addressed. Um, if there isn't that need, it's difficult to get, ah, to get people together, it just, people are busy, it's like, "I don't time for this. This is not important to me." […] There has to be, everyone, all the stakeholders that, you know, that, you know, have to be at that table, they all have to feel that there is a need for whatever it is you're going to propose.

Practitioners developed this sense of need for a variety of reasons, including: feeling that their

primary mandate needed to be addressed; organizations prioritizing the work over other projects;

or the issue reaching a certain level of relevance or urgency. For example, P14 (food safety

expert) explained that they worked on developing food safety guidelines for food security

initiatives because they felt the need to ensure that appropriate food safety procedures were

incorporated into these initiatives:

> Um...well, ah, I guess, from a, you know, there's like a food safety need. […] I mean that's, kind of, my primary mandate, and, you know, you see a situation where, okay if things really go wrong here, ah, you know, from a food safe viewpoint, then a whole bunch of people could get really sick, so, ah, I guess that's kind of the first incentive, to make sure that that doesn't happen, so let's, you know, what can we do to make sure that doesn't happen […]

> In order to purposefully engage with people who bring value to the collaboration,

practitioners needed to know who to engage with, including individuals in the other sector, or

people who had previous experience collaborating with the other sector. Not knowing who to

engage with, or not knowing in general that a connection should be made, was seen as a barrier

to successful collaboration, as P8 (manager, food security) demonstrated when they discussed

that there are players involved that may not be well-known:

> It's like, "okay, we had, you know, schools want chickens, so what is the policy around that?" and um, and, recognizing who the players are, because that was a very specific

example, where [it] wasn't even an EHO who was telling the schools that they couldn't eat the eggs, you know. […] It was the vet. The provincial vet […] and I don't even know who those people are. I mean, I didn't even know about this provincial vet until I talked to people and I was like, "where did this come from?" you know, and um, and so, I think there's even people that we don't know about who would need to maybe be at that table […]

Practitioners that knew who they could talk to did not recognize that some practitioners might not know who to engage with, and therefore they did not recognize that knowing who to engage with was a facilitator to collaboration, as illustrated by P9 (manager, health protection/environmental health) when they gave advice on how to move these collaborations forward, without recognizing that some EHOs may not know the nutritionist they should call, and vice versa:

Don't be afraid to pick up the phone and call the nutritionist, and ask certain questions, and vice versa, for the nutritionist to call the health inspector and say, "hey, we've got this situation, what do you think of this, is there a way we can do something different?" Ah, I think you have to open up those lines of communication, and ah, have the dialogue at the local level first to build, um, you know, into something that's going to be, um, you know, a little more meaningful, ah, to improve the overall public health.

Openness to, and understanding and valuing, the goals, outcomes and restrictions of the other sector

Openness to, and understanding and valuing the other sector were identified by all participants as facilitators for collaboration, which also included openness to and valuing collaboration with the other sector. Participants spoke to either working with practitioners who had these viewpoints, or helping practitioners develop them. These factors were considered important for successful collaboration because the fact that there were two different sectors involved in these collaborations was often considered a barrier that could be difficult to overcome, as explained by P13 (EHO):

So when that two different point of view comes together, there is a, ah, just basically talking at different levels, where the communication and the challenges comes in,

because they hold on tight to the healthy eating, we hold on tight to our food safety, and how do we bridge that, and harmonize that to make it a document, or some public messages that can actually incorporate both, so I think that's where the challenges came in.

P8 (manager, food security) demonstrated how being open to, and understanding and valuing the other sector were important factors in successfully collaborating with the other sector:

> […] you need to really be open to hearing the different conversations. You have to go in with an open mind and recognize that, you are coming from different priorities, you know, from the food safety perspective, they're there to protect the public, and that's their main concern, and theirs is to protect them from foodborne outbreaks and foodborne illness, and ours is from a different perspective coming from food security. We need to, we want to make sure that they have access to really good, healthy food and we want to promote local farms and we want to make sure that, you know, that people are cooking from scratch, and not just eating prepackaged food and sort of recognize that we do come from different perspectives, but it's an opportunity for education, for understanding, and for open dialogue […]

There were many components of the other sector that were identified as being important to understand and value, including their health impact, health outcomes, risks, perspectives, mandates, culture, challenges and resources. For example, P14 (food safety expert) described how food safety guidelines were developed for culled game meat, which was possible because the food safety and food security practitioners each understood and valued the outcome of the other sector:

> Um, you know, say with the culled game meat, I mean we were getting requests from, you know, these municipalities or regional districts, saying, "hey, you know, we're having all these deers killed, and, you know, wouldn't it be nice if, you know, we could somehow process and donate the food to, you know, the local food bank, or First Nations folks or, you know, whoever," and um, and we're like, "well yea that would be a good idea because it's, you know, it's high quality food, um, so let's, kind of work together and make sure that it's done safely. So, that, you know, they don't get sick when they eat the food."

Additionally, P1 (food security expert) expressed that taking the time to understand the requirements that food safety practitioners were mandated to follow improved their ability to successfully work with them:

[…] and also, one of the things I think that has, um, enhanced my own personal efficacy in this work is taking the time and making the effort to understand the mandate of these people working in government. Because, you know, very few of them are mean spirited and ill- intentioned, and they're tasked with a significant public good, and I think, as community-based food advocates, understanding what their particular mandates are is a really useful thing to know, in order to be able to work effectively in collaboration with them. Because if essentially, we're going to them not understanding what they're legally and professionally obligated to do, and asking them to do something other than what they can, is not fair.

P8 (manager, food security) observed that conversations between the two sectors could also help practitioners develop an understanding of the alternative viewpoint:

I think that struggle had to be there. I think those were questions that had to keep - they had to be addressed, you know, from both perspectives and I think it was a learning opportunity, for those of us who maybe weren't, were coming from the food security more than the food safety, um, perspective, and also for the food safety folks to understand the food security perspectives. So I think that conversation had to be there, to understand what the concerns were, and also what the context was, and how each of the different sectors was approaching, this um, the issue.

Not understanding the other sector was considered a barrier to collaboration because it could prevent practitioners from recognizing the usefulness of collaboration, as P5 (dietitian) identified below:

I was going to say, it's so important to have healthy and safe food, I mean, because that's my background, that's my education, but um, again, bringing that importance of you know, it's- and just that - and I don't think environmental health officers have that understanding of child development, and the importance of, you know, what you offer them, and what you role model at an early age, is long-term. I don't think they have that expertise to understand when they're going in and saying, "well no, you know what, this milk, and these dairy products, you know, you can't - those are potentially hazardous foods, like, just don't even think about serving them," rather than, "let's come up with, again, innovative, creative solutions based on all of the different barriers in place, um, to, um, create this environment where we're building these healthy kids," because they don't have that understanding and expertise […]

In addition, not understanding the other sector could also result in exposing vulnerable populations to hazardous food. For example, P2 (food security lead) minimized the risk associated with *E. coli* when they discussed the role of food safety regulations in daycares: "You

can't ban hamburger from pre-schools, right, (laughing) because they have a risk of *E.*

coli…whatever."

Providing explanations about the importance of specific health outcomes to practitioners in the other sector underpinned understanding and valuing the other sector, understanding the importance of a specific project, and influencing how others work. For example, P10 (EHO) found that educating the food industry operators helped EHOs achieve the results they were working towards: "[…] if you try to make people understand that, "look, this is the way, best way to do it", and you try to make sense of those rules to them, people do listen and they'll find a way to make sure that they actually meet the outcomes of the intended requirements." P3 (dietitian) also found that informing food safety practitioners on the importance of specific food security projects facilitated their collaboration on the projects:

> […] and um, I spent time at the beginning, I guess, trying to make the argument to my colleagues about the importance of health and healthy eating, and, sort of, bringing that broader perspective, and certainly there was um, not the 100% buy-in, I would say at the beginning, um, with other members of the team, but I think, you know, showing the research and evidence on, you know, the impact of healthy eating, on the health of children, and the importance of exposure to food, and, um, the opportunity that we had, um, with child care facilities to reach such a large number of children, I think that, um, that people all came on board and did believe in that.

Similarly, P13 (EHO) identified that better understanding why other practitioners within their own sector believed the collaboration was important facilitated the collaboration process: "Because, interestingly, in this- in my- in the environment that we work- or I work on, we rarely have to deal with this kind of issue."

Participants described two different ways that this education could occur: as a specific activity that can be done by public health practitioners, or put in place within public health organizations or projects; and as a method of communication. Specific activities suggested to educate practitioners in the other sector included workshops, orientation procedures, resource

documents, training, and gathering data, among others. For example, P5 (dietitian) identified

that workshops brought public health practitioners of the different sectors together, and provided

them with opportunities to learn from each other:

> Um, another, sort of, school example is the workshop that I mentioned. We actually
> bring, um, food suppliers in, ah, that offer healthy choices that meet our provincial
> guidelines, and then the EHO would go around and talk to those suppliers, um, and let
> them know about, um, some strategies to ensure that it's safe food as well […]

> So, one of the people who has been really quite rigid, we actually invited [them] to come
> and speak at the first workshop that we call it, it's called [workshop name] for parents,
> and so [they] actually [were] able to go around, and meet the, um, food companies, and
> then [they] listened to the, we brought in the [dietitian] who spoke about the guidelines,
> and the parents actually shared about successes and challenges in dealing with the
> guidelines - or trying to offer healthy foods, so it provided [them] an opportunity to see it
> from a different lens.

> P14 (food safety expert) discussed that explaining the scientific rationale for certain food

safety requirements to other public health practitioners, rather than simply telling them what to

do, could result in better outcomes:

> And that's, kind of, something that I've, you know, I've found, you know, in my other,
> sort of, parts of my work, um, you know if people are told why something has to be done
> a certain way, not just, "you have to do it this way, and don't talk to me again." Um, you
> know, if they're told why, and explained why, then, you know, if it's a logical reason,
> especially if it's a reason other than, you know, "because, you know, it's in the
> legislation," ah, but, you know, there's a true, you know, food safety reason for it, ah,
> then most people will kind of like, "oh, okay I didn't know that." […] So they're more
> likely to um, you know, to accept it, versus just being told, you know, "well that's what
> the law says, and you've got to do it."

However, P11 (dietitian) argued that simply telling people what to do can still get the job done as

it requires practitioners to figure out a way to achieve the desired result, even though doing so

could create tension between practitioners of the two sectors, when they discussed the way that

enforcement of the provincial trans-fat legislation was assigned to food safety practitioners:

> […] the province decided, "we're enacting this," and so they enacted it, (laughing) and
> all of a sudden, it's somebody's responsibility to get it done. And so, it got done, and,
> yea, there were a few bumps along the road, and, you know, it probably would have been

better to have the training before the roll out, but it all happened, it's all happening now, it's shown itself to work quite effectively. Sometimes it isn't that matter of, um, that the adversity that arises is simply being told, "you have to do this." […] Which is, you know, maybe not the greatest... (laughing) ...thing to have happen. You know, nobody likes being told what to do.

Similar to the importance of providing explanations about health outcomes and the rationale behind specific requirements, all participants discussed the importance of communicating clearly, in a way that resonates with the audience, as a facilitator for collaborations between the two sectors. P14 (food safety expert) demonstrated this importance when they discussed that food safety guidelines were more likely to be accepted by the temporary food market industry when food safety practitioners clearly communicated the rationale behind certain food safety requirements in a way that resonated with the industry:

> […] they appreciated being told, you know, if the answer was "no", ah, why. […] And that's, kind of, something that I've, you know, I've found, you know, in my other, sort of, parts of my work, um, you know if people are told why something has to be done a certain way, not just, "you have to do it this way, and don't talk to me again." Um, you know, if they're told why, and explained why, then, you know, if it's a logical reason, especially if it's a reason other than, you know, "because, you know, it's in the legislation," ah, but, you know, there's a true, you know, food safety reason for it, ah, then most people will kind of like, "oh, okay I didn't know that." […] So they're more likely to um, you know, to accept it, versus just being told, you know, "well that's what the law says, and you've got to do it." […] and that doesn't work very well.

P7 (manager, health protection/environmental health) pointed out that clearly explaining what you are trying to achieve was important for avoiding potential negative consequences between practitioners of the two sectors within an attempted collaboration:

> […] what you're trying to achieve is a goal, like, you don't have to know what you're trying to achieve, you just have to know why you're communicating. […] You don't have to know, like, everything, but you do have to know – because you- especially with food safety and food security, if you're not really clear with what your message is, and you start out with confusion, you're, you know, it's really hard to get that back. And it's really easy to create, um, conflict and tension, especially if you point fingers, so, that's my point, is just know what your goal is of your- of why you're act- even communicating in the first place. Because people communicate for various reasons, and often they're not

very clear on what their purpose of communication is. […] They just start communicating, hoping for the best, and I'm like, "well be clear what you want" […]

In addition to how the two sectors interacted with each other, both P8 (manager, food security) and P9 (manager, health protection/environmental health) identified having "[…] an open mind […]", and P7 (manager, health protection/environmental health) identified being "[…] willing to be collaborative" as essential to successful collaborations. P12 (EHO) discussed that not being open to collaboration can result in not noticing opportunities even when they arise:

> […] and, maybe, you think about doing it more if you've heard about it, but if you're just doing your day-to-day grind, and you've got the blinders on, just like me, um, you never see it, never even, you know, even if the opportunity falls in front of you, that's not what I'm looking for, so, um, it doesn't happen.

In addition, P4 (dietitian) explained that if people felt that their perspectives were not valued in the past, they might not be open to future collaborations:

> ...I think, like, you know, yea, I think those are two important areas because there, historically, there's been countless, endless situations where First Nations have been asked - and, you know, you hear that word consultation, right (R: laughing) - um, but it's, um, the other side of the position has already decided, um, so they don't really hear, and of course they don't value. Um, and so in lots of situations, people stop talking, because they know you don't value. […] You're gathering information to support your, you know, and to support your conclusion, your position, and not, um, and not value the other perspective.

Having "an open mind" to other ways of achieving safe food could lead to better collaborations with practitioners of the other sector, as discussed by P14 (food safety expert):

> […] and I think this goes for a lot of, you know, folks in government or whatever – that, you know, that you think that you do have all the, you know, have the answers and, you know, this is the right way to do it and that's that, um, and it's, um, and I don't know, I think I've just found that, um, you know, over the years, just, you know, speaking to different people with different backgrounds, um, it just has been, um, yea, I guess, you know, often pleasantly surprised, just knowing that, um, you know, there are other ways of doing things that are still going to result in safe food. […] And just be open to that.

Many participants discussed that they wanted to feel a level of trust that the information they bring, the outcome they are trying to achieve, and they themselves will be listened to and

valued by the other practitioners. For example, P12 (EHO) explained that when food security

practitioners believed that the food safety practitioners would value their goals, collaborations

occurred more smoothly:

> […] and [they] saw us doing that, and it was like, "wow, things have changed here. You are guys are, you know, smart (inaudible) and stuff, so maybe we can talk to you," and there was, sort of, a whole lot more trust, um, between us, because we weren't always saying no to their wonderful new ideas, and they were, you know, they were, seeing that we're actually doing the collaboration, and doing the progressive enforcement, and so what happened there is it facilitated, um, some communication about their computer lists and ah, you know, their new programs coming out, and all that kind of stuff.

Likewise, P8 (manager, food security) explained that it was important for food safety

practitioners to trust that food security practitioners also valued providing safe food to the public:

> […] but I think, there is a lot to be said, by that informal communication, and just, working closely together to better understand the context and to trust that, you know, that, from the food security perspective, that we do care about food safety. We don't want kids to get sick. You know, and to understand, and that trust, I think, is there, and um, and that, collegiality, can go a very long way.

However, P4 (dietitian) illustrated that when there was a lack of trust about how provided

information would be managed, collaborations were unlikely to occur:

> There's, you know, there's things I need to do to go and get some of it, so, um, you know, and to prove, like I need to prove that I, um, will value it. Right, so. Actually that's a big, that's a really big um, piece of it, because if I want - you can ask for information. You have to prove that you'll value it. […] Well it's just the, like, the level of information you get will be dependent on, um, how you demonstrate that you value it.

Creative, realistic, and solutions-oriented problem solving targeted to desired outcomes

"[… Creating] innovative, creative solutions […]" [P5, dietitian] was identified by most

participants as a facilitator for collaboration, and consisted of thinking creatively, looking

beyond what has always been done, and problem-solving different ways to achieve an end goal

or address an issue or barrier, as discussed by P9 (manager, health protection/environmental

health):

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[…] I think you just, you kind of have to have an open mind, ah [...] when an idea is, ah, brought forward, and look for the outcome, and how do you get to that outcome, ah, what are the barriers that are in the way, and what are the possibilities of overcoming those barriers, is there something that can be changed, or an attitude change that may occur that may allow for that ah, barrier to be overcome. Sometimes it's just the change in the way you do business locally, um, there's not a really, a big increase in food safety risk, it's more about how you approach it.

P7 (manager, health protection/environmental health) identified that practitioners who do not

creatively problem solve might limit collaboration:

You know, it's, some areas of the province did really well, because they had the right people in the right positions, and some areas of the province didn't, because some people were so black and white, that they had a really hard time, you know, thinking about how, you know, guidelines could be modified, or, you know, standards would need to be changed to help, you know, help further food security, but not create unsafe situations […]

However, P11 (dietitian) identified that the ability to implement creative solutions was different

in rural rather than urban settings:

[…] there's more flexibility and the realization that there are a variety of solutions to any one issue, and so, that flexibility, just, be - first off, there's the ability to be flexible, and then the ability to consider that there are many solutions. Those things make a difference to the opportunities for collaboration, because people aren't, sort of, set in their roles.

Focusing on "[…] the desired outcome […]" [P14, food safety expert] rather than on

upholding usual processes to get to the outcome was identified as important to successful

collaborations, as it allowed innovative activities to occur as long as the food safety outcomes

were met, rather than requiring specific processes that may not be applicable for new programs.

For example, P14 (food safety expert) discussed how the food safety legislative requirements

were adapted for temporary food markets:

Um, so, saying that, um, you know, it was - there was some difficulty in - and I think what we ended up really doing was, um, taking the, what we felt was the outcome of the various prescriptive requirements, taking those outcomes, and transferring those to, um, ah, to a temporary food market, so, um, you know when, ah, say ah - I'll just use an example like, ah, let's say a regulation says, you know, that, you know, mechanical refrigeration, or, is required, ah, in a food service establishment, to keep the food at 4

degrees Celsius or less. Um, I mean, the real outcome in that, is that the food is always kept at 4 degrees or less - you know, when it has to be refrigerated - so, that's really the outcome that you want to achieve. So, you know, we were able to, sort of, take that outcome, apply it to a temporary food market setting, and ask ourselves, "okay, what can they do to make sure that the food is always kept at 4 degrees or less?" So there's, you know, things like ah, um, you know, if it's appropriate, you know, they can use ice, um, ah, you know, that kind of thing. So, we, you know, I think we were able to, um, you know, apply those outcomes, that are required, ah, to a different setting […]

In addition, most participants identified having realistic expectations and recognizing

"[…] it's better that they have something than nothing […]" [P8, manager, food security] as

important to successful collaborations, which included being reasonable about requirements,

compromising, modifying current practices, addressing barriers, and recognizing context. For

example, P12 (EHO) identified that when developing food safety requirements, it is important to

have realistic expectations of how they will be followed:

> And I guess, my end of things is, okay, how can we do this safely and make sure that, you know, what needs to be done in the way of sanitizing the equipment can be easily done, because if it's hard, it ain't ever going to happen.

P14 (food safety expert) explained that is it also important to be realistic when interpreting and

following existing food safety legislation, such as requiring food to be refrigerated:

> […] we recognize that, you know, food can be left out for, you know, thirty minutes, and it's still going to be safe. Food can be left out for an hour, and it will still be safe, like, you know, we know this scientifically.

However, P12 (EHO) explained that these 'realistic expectations' only applied to certain food

safety requirements, and that major food safety hazards that exposed the public to harm were not

open to compromise:

> […] Now, this is, you know, kind of, the minor stuff. […] Um, I'm talking things like, temperature logs and dishwasher, ah, monitoring, and that kind of stuff. So that, you know, it's a pretty low income, impact kind of a thing, okay, but if you've got rotten meat on the counter, ah, they threw it out then, and I'm going to throw it out now. […] If you've got a public health hazard there. Ah, it still gets dealt with. Make no mistake.

Recognize that the issues are connected, and actively work with that in mind

All of the participants discussed the importance of working with the understanding that "[…] there was lots of, um, pieces that could be missed by not having the cross-program, um, expertise, um, just one of us, kind of, were taking that forward […]" [P2, food security lead]. For example, P14 (food safety expert) provided their view on why it is important to address the fact that both health issues are connected:

> […] ah, I, you know, I guess for me, I've ah, you know, even though, you know, food safety, you know, sort of, you know, acute, you know, illness are sort of my, you know, my primary mandate from a, you know, from a health viewpoint, um, I guess I just, I've tried to, and I - you know, I guess this is what I would say to other people, you know, in, sort of, similar positions, too - um, you know you can look at, ah, at health, you know, health of the population in, you know, in different ways, and, um, you know, whatever you can do to, ah, you know, improve the health of someone, you know, or a population, ah, by, you know, whatever it is you can do, whether it's, you know, developing a guideline, or facilitating a, you know, maybe a different way of um, how food is, you know, processed, or distributed in your, you know, your community, um, and, you know, you should be willing to look at that. You know, it might, you know, take a bit of effort, but um, you know, in the end, it's, ah, it'll be worth it.

Conflicts had the potential to arise when practitioners did not work with the understanding that their actions could influence the health outcomes of the other sector, as P5 (dietitian) identified:

> So, with the environmental health officers, sort of, perspective, it's very much about – well, their role is food safety - so often the foods that are safe – safer - are often packaged, um, foods, and processed foods, which don't always align with some of the foods that we're trying to promote with schools.

P5 also explained that these conflicts could be detrimental for collaborations: "[…] but we need to actually have something that brings those two groups together in a more formalized rather than this, sort of, informal – in sometimes, or many times – conflict, kind of...positions that we're put in." However, conflicts between the two sectors were not always considered a barrier for collaboration, as many participants from both sectors identified "[…] points of tension […]" [P7, manager, health protection/environmental health] as factors that "[…] initiated more of a collaborative work […]" [P5, dietitian]. For example, P13 (EHO) discussed why tension was

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useful in driving the development of documents that harmonized healthy eating and food safety messages:

> […] even though we have different priorities, even they may be frustrated, we may be frustrated because of different priorities, the main goal here is how we can actually harmonize it and create a document, so, and that works really well, I would say, we still have some, like, um, frustration during that discussion, but the frustration is manageable - or at least manageable, ah, to facilitate that discussion - and I think it's needed because you need to have that frustration to understand, "wow, the challenges, how can we solve this challenge for now- at least for a while, with this new document, they are not going to feel the same frustration anymore."

Many participants discussed that new issues continued to emerge in the relationship between foodborne disease risks and food security initiatives, and therefore tensions between the two sectors are "[…] never going to be completely solved, because there's always going to be new issues, there's going to be new knowledge, there's going to be new research, and there's going to be new programs […]" [P8, manager, food security]. P9 (manager, health protection/environmental health) illustrated how developing food safety guidelines for food security initiatives like food banks was challenging, as the pertinent food safety risks change as these initiatives evolve:

> Now, one of the challenges that we're facing ah, with that is, um, the shift to accommodate different models, um, where, you know, back in the old days, it used to be you had some leftover canned stuff in your pantry, you donate to the Food Bank and the Food Bank redistributes it to a needy family or whatever, but now there's all sorts of different, um, setups where charities might receive discounted products, um, and ah, use those even though they're purchasing them, it's not donation anymore, and they might generate revenue from products they're making if they sell it um, to generate ah, funds to, ah, support a food bank or something like that, there's all sorts of different models, and that's what the BCCDC is working on, a set of guidelines right now, and it's pretty complicated […]

Despite the challenges that can arise from these emerging issues, P14 (food safety expert) discussed how new food security initiatives, such as donating culled game meat to food insecure individuals, could serve as incentive for collaboration between the two sectors:

> This is where, usually municipalities - or cities, small cities - um, have a problem with - well it's always deer - ah, so they hire a hunter to, um, go and kill the deer. […] There's too many of them, and then they ah, so they take the killed critters, and um, they, they'll take them to a cut and wrap, and ah, get them cut up into, you know, steaks and things, and ah, and then, the meat's donated to um, you know, to needy people in their community, so, again it's, ah, again it's just, from a food safety regulatory viewpoint, this is like, something that's, you know, very different. It's certainly not something that we, you know, we're used to, so we just developed the guidelines for something like that, you know, recognizing that it's, ah, you know, that the benefits of having, you know, sort of a high quality, you know, high protein food given to ah, you know, to folks that need it.

In addition, fear of negative food safety outcomes was discussed by participants as leading to not wanting to take any food safety risks, which could either elicit more rigorous food safety enforcement, or prompt addressing food safety within programs. For example, P14 (food safety expert) discussed how the fear of negative food safety consequences could result in stronger enforcement of food safety legislation, which could restrict food security initiatives:

> Well, what - I will say, the one thing that I, you know, in talking with my counterparts in some of the regional health authorities, um, there is often a reluctance by, you know, by – and not just regional health authorities, but even other food safety regulatory agencies – um, there is a reluctance to, um - what the right word is here – permitting different ways of doing things, ah, because there's always that fear, or that risk, that, "oh, you're allowing them to do something that isn't, you know, spelled out in legislation," or might even be - I don't want to say bending the rules - but it's, you know, if you're, it can be, um, you know, sometimes some, you know, some of the legislation we work with is really old, and it's really written very prescriptively, and it's, you know, "this is the way it said it's supposed to be done, and we're not quite doing it this way." Um, there is always a fear that, you know, somehow, you know, it's going to be your fault if something goes wrong, or, ah, you know, you're going to be liable or you're going to be held responsible.

The fear of negative food safety consequences could also act as a driving force for the involvement of food safety practitioners in food security initiatives, in order to address the foodborne disease risk that could result from these initiatives, which P14 (food safety expert) demonstrated when discussing why they became involved in developing food safety guidelines for specific food security initiatives:

Um...well, ah, I guess, from a, you know, there's like a food safety need. […] I mean that's, kind of, my primary mandate, and, you know, you see a situation where, okay if things really go wrong here, ah, you know, from a food safe viewpoint, than a whole bunch of people could get really sick, so, ah, I guess that's kind of the first incentive, to make sure that that doesn't happen, so let's, you know, what can we do to make sure that doesn't happen […]

Having "[…] a common understanding of where you want to end up" [P9, manager, health protection/environmental health] was identified by participants as a concrete way to actively work with the recognition that the two sectors are connected, and to move forward with a collaboration despite potential conflict between the sectors. For example, P10 (EHO) discussed that identifying a common goal was necessary for the success of a project: "My advice is, um, before they even get into, um... before they even get into anything, they better make sure that their vision is actually along the same wavelength. […] Otherwise - if their vision is not the same, nothing else below it is going to be the same." However, P7 (manager, health protection/environmental health) mentioned that working towards a common goal was not always enough to make a collaboration successful:

> Well there's a difference, because there was a purpose behind the committee. […] Do you know what I mean? Like, there's a purpose, there's the right leadership, there's resources, there's the infrastructure. You can't just bring people together, you know, on a committee and say, "let's make it happen." Like, there has to be, there are factors to success, right.

P10 (EHO) explained that although it was often difficult to do so, working towards a common goal benefited the collaboration:

> […] the vision made it extremely difficult at times to bring people together, but, you know, at the end of the day, we kept going back to, "what is our goal here?", and if you keep bringing people back to that, and you keep bringing their focus back to that, sooner or later people will say, "you know what, at the end of the day that's what we're trying to achieve." How we get there is, that's not the point. But, we get there.

Ultimately, understanding that both sectors were working towards the same goal of improved population health could lead to successful collaboration between the two sectors, as illustrated by P3 (dietitian):

> That's exactly another piece that we put into this backgrounder document, um, yea, again, sort of the focus about the summaries, the take home message that we're trying to make is like the ultimate goal is the best health possible for children in care. It includes immediate health and safety, as well as lifelong health, and, like, keeping in mind about, you know, how the effect of chronic disease, and the percent of population that's going to be affected by chronic disease, um, due to poor eating habits and lifestyle, um, versus, you know, that, the immediate food safety risk. […] And in trying to balance them, because they're both really important, but just broadening thinking that you can't only be thinking about just immediate health and safety, and that's something I'm not sure, um, that everyone involved with food safety thinks about all the time. […] Oh that immediate risk.

The barrier of preferential entitlement: believing that one position "trumps" the other

While all of the previous factors were discussed as facilitators when present and barriers when absent, or both a facilitator and a barrier depending on the different perspectives, only one factor was identified by participants from both sectors as being exclusively a barrier to collaboration: belief that one's own position should "[…] take precedent […]" [P2, food security lead] over the other sector's due to importance or legitimacy. Each sector had their own reasoning for why they believed their position should "take precedent" over the other; however, both sectors used the same kind of rationale. The reasons outlined by the participants included external guidelines and regulations, as well as the magnitude of their health impact. For example, P2 (food security lead), stated that food security should "trump" food safety because of a national guideline:

> […] basically, Canada's Food Guide is a national guideline. […] For healthy eating in Canada, and provincially we use that as a tool, and we, you know, everybody is implementing working towards healthier food choices. […] So, you can't trump that. You can't, sort of, say, "kids can't eat salads, because they're dangerous." […]

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P14 (food safety expert), on the other hand, indicated that food safety should "trump" food

security because of food safety legislation:

> […] I mean from a food safety viewpoint, I mean, there are certain things that we have, you know, we have to insist upon, like, this is the way it is, like, food, you know, if food is potentially hazardous, it has to be kept refrigerated until it's sold, like that's just, that's the way it is. Um, however, saying that, um, also - I mean that's in the, you know, the legislation, and it's, you know, it's very clear, blah, blah.

Proceed despite the broader environmental barriers you face

In addition to the above facilitators and barriers, all of the participants raised the issue of

various broader environmental factors that were important for the success of collaborations

between the two sectors, but were more or less static factors that were difficult to change (Table

5.1). Many participants spoke to these factors as things that need to be recognized, but would

not necessarily prevent collaborations from occurring. Specifically, participants explained that

collaborations could proceed despite these broader environmental barriers, particularly when the

facilitators identified above were in place to support such collaboration.

5.4 Discussion

In this study, we identified factors that facilitated or were barriers to past or current

collaboration between food safety and food security practitioners in BC, Canada. Participants

discussed many factors that were considered facilitators when they were present and barriers

when they were absent, and a few factors that were considered both facilitators and barriers,

depending on the perspective through which the factor was viewed. The facilitators and barriers

identified by participants were as follows: having personal connections with practitioners of the

other sector, or practitioners who had experience collaborating with the other sector;

purposefully engaging with the different types of people who bring value to the collaboration;

being open to collaborating with the other sector, and understanding and valuing the other sector;

creating creative and realistic solutions that work towards desired outcomes rather than following entrenched processes; and actively working with the understanding that the two sectors are connected. Despite most factors being discussed as facilitators when present but barriers when absent, or both as a facilitator and a barrier depending on the perspective taken, one factor was exclusively identified as a barrier to collaboration: believing that one position is more important than the other for externally legitimized reasons. In addition, participants identified many factors that were part of the broader public health environment that were difficult to change, and therefore needed to be acknowledged; however, collaborations could ultimately more forward and overcome these factors by using the facilitators that were identified.

While the factors that impacted the success of collaborations between the two sectors were presented separately in this paper, participants discussed many of these factors together, either as working synergistically or in opposition of each other. No single factor was identified as being more important than the others; rather, the more facilitators that there were in place, the more likely the collaborations were to succeed. For example, clearly explaining the importance of specific food safety regulations to food security practitioners could lead to the food security practitioners realizing the importance of the food safety outcomes, as well as the development of personal connections between practitioners of the two sectors, and could ultimately lead to more successful collaborations. Alternatively, collaborations could be prevented despite public health practitioners of the two sectors being personally connected if one practitioner believed their health outcome was more important than the other sector's health outcome. In addition, a few participants noted that there were ways to ensure multiple facilitators were in place at once, such as having practitioners from both sectors work in the same location, as a way to foster collaboration. This "co-location" encouraged multiple facilitators, such as developing personal

connections with practitioners in the other sector, and understanding and valuing the other sector. However, in reality, the interaction of facilitators and barriers were often more complex than outlined above. For example, for the amendments to the Meat Inspection Regulation, the needs of different contexts conflicted within the same setting, which required creative and solutions-oriented problem solving, and finding a common goal in order to come to a final solution that benefitted both sectors.

This was the first study to explore the perspectives of public health practitioners working in food safety and food security on factors that they felt facilitated or were barriers to collaborations with practitioners in the other sector. Previous research has focused on ways to reduce tensions between practitioners of the two sectors (Martin & Perkin, 2016), and how food safety inspectors adapted regulations to work with small-scale operators (Buckley, 2015). Specifically, "communicating", "understanding intent", "educating", "understanding risk and regulation", "recognizing scale", and "enhancing partnerships" were identified as factors that could reduce tension between practitioners of the two sectors (Martin & Perkin, 2016), which align with the factors that were identified in this study. However, the approach taken by Martin and Perkin explored how to reduce tensions between practitioners of the two sectors, while this study explored factors that influenced the success of these collaborations, including factors that were perceived to be facilitators. Focusing on available assets as a solution to a health problem, rather than on the problem itself, has been useful in overcoming existing barriers to other public health issues (e.g., physical activity in disadvantaged women; Rütten, Abu-Omar, Frahsa, & Morgan, 2009). Therefore, looking at facilitators to collaborations between practitioners of the two sectors, rather than exclusively looking at the tensions between them, may better identify ways that practitioners can proceed with collaborations despite existing barriers. Buckley (2015)

also identified similar factors to those identified by Martin and Perkin (2016) and this study, including relationships between the operators and inspectors, education, and "flexibility and mutual accommodation", which she identified as factors that influenced the successful adaptation of food safety regulations to small-scale operations. However, adapting food safety regulations to small-scale operations is only one of the ways that food safety and food security practitioners can collaborate to support improved population health. This study identified facilitators and barriers for a broader range of collaborations between food safety and food security practitioners. Therefore, while the facilitators and barriers that were identified here are in line with those available in the literature, this study provided an exploration of factors that influence the success of a broader range of collaborations between the two sectors, and identified available assets rather than focusing exclusively on barriers.

This study is subject to several limitations, namely that the public health practitioners included in this study may not be representative of all practitioners working in the food safety and food security sectors in BC. Here, all of the study participants had previous experience successfully collaborating with practitioners of the other sector. Therefore, the facilitators and barriers that were identified here may not be the same facilitators and barriers felt by practitioners who have been unable to successfully collaborate with practitioners in the other sector. Specifically, this study may underestimate the extent to which barriers affect collaborations between the two sectors. In addition, the study participants were all mid- to late career; therefore, this study may not accurately depict the factors that are experienced by public health practitioners who are at the beginning of their careers. Buckley (2015) identified that younger inspectors were less collaborative than more experienced inspectors, so practitioners at the beginning of their career may experience the facilitators and barriers identified in this study

differently, or may experience different facilitators or barriers. Further research is needed to better understand the breadth, and relative significance, of factors that influence the success of collaborations between public health practitioners working in the food safety and food security sectors.

Despite the above limitations, this study addressed a gap in the literature regarding factors that influence the success of collaborations between practitioners of the food safety and food security sectors in BC, and provided the first in-depth exploration of these factors from the perspective of practitioners who have previously collaborated with the other sector. Because this study explored the perspectives of practitioners who have successfully collaborated with the other sector, this study provides ways to overcome existing barriers to intersectoral collaboration, which may be useful in supporting more collaboration between the two health sectors, despite their historical separation. To this end, this study outlined specific activities individual public health practitioners working in the two sectors can do to more successfully collaborate with practitioners in the other sector in the future. Therefore, this study provides the first available exploration of ways that food safety and food security practitioners in BC can more successfully work with practitioners outside of their sector, to more successfully improve the health of the population.

5.5 Conclusion

This study identified factors that influence the success of collaborations between public health practitioners of the food safety and food security sectors in BC, thus revealing ways that these practitioners can more successfully collaborate with the other sector in the future. In addition, this study highlights the negative impact of 'silo-ing' public health efforts, to ultimately suggest the importance of more and better collaboration with other sectors in public health

efforts. More research is needed to explore the full range of facilitators and barriers felt by

public health practitioners of these two sectors, as well as to identify what regional health

organizations, provincial health organizations, and the public health realm in general can do to

promote and support more collaboration between practitioners of the two sectors, in order to

better support improved population health.

Table 5.1 **Broader environmental factors that need to be recognized, but that collaborations could move past when facilitators were present to support such collaboration**

Broader environmental factor	Broader environmental factor description	Exemplifying quote
Natural lag time	Collaborations have a natural "[…] lag time […]" [P13, EHO], and "[…] you've got to keep plugging away […]" [P11, dietitian] because collaborations "[…] might not flow as quickly as you think" [P4, dietitian].	And, so it's just a matter of you've got to keep plugging away at stuff, and keep doing it, and keep doing it and keep doing it, and then all of a sudden, you'll be the overnight success, for your thirty years of work. [P11, dietitian]
Context	Each specific context (e.g., setting, population, program, organization, scale) presented its own opportunities and challenges.	Basically now when [the EHOs] go in to do an inspection, they also inspect, ah, the fat sources in use in the restaurant. [P11, dietitian]

| Culture and perspective | The culture, philosophy, or perspective of the sectors, the different organizations, and the public health realm in general needed to be "[…] more public health oriented […]" [P7, manager, health protection/environmental health] rather than silo-ed. | Because really, it's more about, um...you know, their own perception of what's allowed and what isn't allowed under the legislation, and maybe pressure from peers, that, you know, "oh, you let them get away with this, oh my goodness," you know. "They need to have six sinks in there if they want to wash properly," um, you know, there's some ah, interoffice, um, and ah, intraoffice, um, kind of, comparisons [...] about what was allowed and what isn't allowed, and how you, kind of, guide, um, the approval process through that um, ah, you know, the normal channels. So, I think that that permission is kind of a - you know, as I say, with quotations marks around it, but - um, you know, it gives that EHO that wants to venture into an area that seems to make sense from a food security point of view, but doesn't really increase the risk greatly, ah, from the food safety side of it, that permission to venture down that road a little bit, to maybe do what may be better on the broader, um, view of public health, by improving that food security. |

		[P9, manager, health protection/environmental health]
Resources	Collaborations take resources (such as time, money and people), which are often limited.	Um, when there is money and time to do those kinds of collaborative work, um, I think it just, when you have all of these amazing people coming together, the innovation and the creativity that comes out of it, and the solutions that come about are just so rich, and so – but, again, there has to be some, often, money is one of the key resources that helps […; P5, dietitian]
		Um, money is important. (laughing) You know, ah, most people - public health is a very under-funded area, and so, if you don't have seeds, or long-term seeds - this is something that we've struggled with for years, that, you know, there is no funding available to get certain initiatives, and so you're always trying to carve off people's time, or off people's desks, or those kinds of things, so, it is always helpful to have a little bit of funding or resourcing to actually do, um, to do things […; P7, manager, health protection/environmental health]
Worth the	Collaborating with the	You know what, I'll, you know, I will be kind

resources	other sector might be considered difficult or time consuming, but it was worth the resources because "[…] you're going to end up with a lot better results […]" [P14, food safety expert].	of honest with you. Um, it is a real pain sometimes, working with a lot of different stakeholders, like, you know, it is sometimes, you know, I do wish I could say, "oh, to hell with this, I'm just going to do it myself," (R: laughing) and, you know and just, "here are the guidelines and just be quiet," but, you know, at the same time, saying that, I know that if you go that route, um, you know, your guidelines aren't going to be really picked up by anybody. They're, you know, you're not going to have any credibility. Um, and you'll end up, you know, sort of shooting yourself in the foot. So, while it is - yea, I'll be honest - it is a lot more work. It's, you know, collaboratively, and working with different stakeholders and different groups and all that kind of thing. You know, I guess I've come to realize ah, in the long run, you're going to be a lot better off, you know, your guidelines will be accepted, they'll be followed, um, you know, other people will promote your guidelines, um, so it's, you know, you end up with a much better, ah, final result.

		[P14, food safety expert]
Leadership	"[…] leadership that is very interested in collaboration […]" [P2, food security lead] was a facilitator to collaboration between the two sectors, while leadership that did not support collaboration could be a barrier.	Um, well I think, what made it, ah, easier is for one, like, having the high level support, like, right up to the [senior title], and, um, you know, our [senior title], and ah, um, [their] manager - which I guess is a [senior title], kind of thing - so, like, when you get support at that level, you know, you get dedicated time, staff time, devoted to working on this, and people identified instead of, you know, just kind of, off side of your desk, kind of, working on something. It does become a main project. That was really helpful […; P3, dietitian]
Organizational structures	Organizational structures played an important role in the success of collaborations, which included legislation, siloes, and committees, among other factors.	Um, also, more recently we've been ah, practically mandated as a contact for the applications for the Farm to School, because there's grants involved, and now the grant application says, "you need to talk to your environmental health officer." […] it's a great thing. […] Um, I think we all, um, encourage, and are happy to see, um, you know, the people at a grant stage, um, come in and talk to us and share information. [P12, EHO]

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Politics	Political will and short-term decision cycle could be barriers to successful collaborations.	Yea, just stick to it. Because it's, like I said, someday a political wind will change without any warning, and all of a sudden, if you stuck to it, you'll have everything ready, and that will make a big difference in your ability to communicate key points. So, just, ah, keep working away to be that thirty year overnight success. (R: laughing) That's what it takes. You just have to keep plugging away and sooner or later, things change, and we then, you know - within my experience - have changed for the better. So, it's slow, but sure. So you just got to keep plugging away. [P11, dietitian]
		Yea, but people don't have that long-term view, particularly when you have politicians that are in for four year terms, and their whole purpose is getting - you know, not their whole purpose, but one of their key purposes is getting themselves re-elected, and so it's in shorter term chunks versus that longer term, you know, the cost is huge to our life, you know, long-term health of our province, but I just don't think that long-term view is often captured when you

		have, you know, politicians that are making decisions about where the money goes, and what happens with land, and... [P5, dietitian]
Differential nature of evidence	The inability to accurately measure preventative health impacts affected the amount of support for these collaborations.	Yes, so, for example, um, immunization does have that measurable, um, evidenced- based data to show, when you immunize, it has this huge cost saving on- in public health, right. So in terms of when we're down nursing staff - which we are right now – um, the priority is "drop everything else, we have to get those immunizations in. We are mandated to do this, and we have to show that we have done it." So, everything else falls to the wayside, unless you have something that has that measurable effect on health, and it's so hard, when you're doing upstream work in population public health, to show that, "you know what, when we actually do these workshops, and the students are exposed to, and learn how to grow, and so on, um, these are the outcomes that we can measure and say, we have to have this time to do this work, because look at what the results are." It's really hard to measure those interdisciplinary,

		population health, upstream initiatives. [P5, dietitian]
Health care priorities	Disease prevention is not always prioritized, which could limit support for collaborations between the food safety and food security sectors.	Ah, so, and, you know, the other thing is that public health professionals, we need more of them throughout the country to push for those kinds of things, so that we can keep the people out of the acute care, and keep them healthy in their homes. […] That's where the – that's where our budgets are being spent right now. Ninety – ah, I would say 91% of the budget in the health care is being spent in acute care. […] I would say 9% of it is actually in prevention, and it should be the other way around. […] Our job is not glorified so, that's why we don't get it. [P10, EHO]
Legislation	It is often difficult to change legislation, which food safety practitioners have no control over.	Um, making changes to legislation is, ah, an extremely difficult thing to do. […] Um, unless there's, like, a real political will to get it done, um, it moves at a snail's pace, and I'll, you know, I'll, kind of, be honest with you, um, to try to go through the legislative change route, um, I mean we'd still be, I'll say banging our head on the wall. [P14, food safety expert]

6. Conclusions

The overall objective of this thesis was to explore collaborations between the food safety, and food security and healthy eating public health sectors in BC. Specifically, the objectives of this thesis were to explore ways in which food security efforts (and the food insecurity issues they aim to address) and food safety practices (and the foodborne diseases they aim to address) may intersect, within the province of BC and from the perspective of the individual public health practitioner; and to identify factors that facilitate or inhibit collaborations between practitioners in the two sectors. To accomplish this, data from semi-structured interviews with public health practitioners working in the food safety or food security sectors in BC, who had previous experience collaborating with practitioners of the other sector, were inductively analysed to explore their perspectives on ways in which food safety practices and food security efforts, and the health issues they aim to address, may intersect, as well as factors that facilitated or were barriers to past or current collaboration between the two sectors.

Participants discussed four main ways in which efforts of the two sectors, and their respective health issues, intersected within the public health realm. Specifically, participants spoke to the different ways that their daily practices intersected, which were partially guided by policies and guidelines in place to address their respective health outcomes that often do not consider their impact on other food-health outcomes. Participants also discussed how the actions of the two sectors could conflict with each other in practice, in part because foods that are considered beneficial for food security are often considered high risk for foodborne disease, and vice versa. Finally, participants discussed the importance of collaboration between the two sectors, because they are both working towards the same ultimate goal of improved population health. Participants spoke to many factors that influenced the success of collaborations between

practitioners of the two sectors, the majority of which were considered a facilitator when present and a barrier when absent, and a smaller number of factors were considered both a facilitator and a barrier, depending on the perspective through which the factor was viewed. The factors that participants identified as impacting the success of collaborations between the two sectors are: personal connections with those in the other sector, and to those who have already successfully collaborated; purposeful engagement with different types of people who bring value; openness to, and understanding and valuing, the goals, outcomes and restrictions of the other sector; creative, realistic, and solutions-oriented problem solving targeted to desired outcomes; and recognizing that the issues are connected, and actively work with that in mind. Only one factor was identified as exclusively a barrier to collaboration, which was believing that one of the two sectors was more important than the other because of its external importance or legitimacy. In addition, participants identified environmental factors that were unable to be changed by the practitioners themselves, and therefore needed to be acknowledged, but ultimately set-aside and overcome in order to proceed with a collaboration.

This study highlights the importance of public health practitioners of the food safety and food security sectors working outside of their 'silos', as their public health actions may inadvertently negatively affect the health outcomes of the other sector, in addition to the importance of collaborating with practitioners of the other sector when developing and implementing initiatives and policies. Not only do their respective health issues share common drivers (e.g., socioeconomic status, Gillespie et al., 2010; climate change, Ahdoot et al., 2015), but participants spoke to the tensions that can arise between the two sectors due to the conflict between the health issues inherent within the food products themselves. Participants also discussed that actions undertaken to address each of these issues intersect within public health

practice, both collaboratively and in opposition of each other. An example of conflict due to public health actions that aim to increase public consumption of food that may be considered risky for the health impact of the other sector is food security initiatives that increase access to fresh fruits and vegetables (e.g., BC Association of Farmers' Markets, 2014), when fresh produce is often considered high risk in terms of foodborne disease (e.g., Kozak et al., 2013; Painter et al., 2013). Despite the conflict that can occur between the two sectors, participants identified that both sectors are working towards the same ultimate goal of improved population health, and so understanding how to support collaborations between practitioners of the two sectors may be important for achieving the best possible health for the population. There are many facilitators and barriers that participants discussed throughout this study, some of which align with the factors that were identified in the literature. For example, developing relationships between practitioners of the different sectors, and educating practitioners of the other sector were identified by participants in this study as important for successful collaboration, which aligns with the facilitators available in the literature (Buckley, 2015; Martin & Perkin, 2016). Buckley (2015) also identified the importance of compromising to find a solution that fits for both sectors, which many participants spoke to in this study as well. Martin and Perkin (2016) identified that recognizing the context of each initiative was important for reducing tensions between practitioners, and participants of this study discussed how each context presented its own challenges and opportunities that needed to be addressed in order to move forward with collaborations. However, this study provided an exploration of factors that influence the success of a broader range of collaborations between the two sectors than Buckley (2015), and also identified available assets rather than focusing exclusively on barriers, as Martin and Perkin (2016) did in their study. Finally, participants described examples of successful collaborations

between the two sectors, which align with examples available in the literature (e.g., Temporary Food Markets: Guideline for the Sale of Foods at Temporary Markets; BCCDC, 2014).

A qualitative approach is well suited to in-depth explorations of the participants' perspectives, as it allows the researcher to explore these perspectives when there is limited research available on the topic, and to gain a deeper understanding of the particular context (Sofaer, 1999). Here, interviews allowed exploration of the perspectives of each participant regarding how they saw the two public health efforts intersecting in practice, and factors that facilitated or were a barrier to collaborations between the two sectors, including how these factors influenced the success of the collaborations. The approach taken in this thesis is subject to several limitations, most notably a small number of participants, and a non-representative sample of public health practitioners in BC. Based on the study design in this thesis, it was not possible to determine whether all public health practitioners working in the food safety and food security sectors in BC have similar perspectives, experience the same intersections between the two sectors, or experience the same facilitators and barriers that this thesis identified. Because participants were purposefully sampled based on their experience of successfully collaborating with the other sector, the intersections, facilitators, and barriers that were identified may not be the same as those felt by public health practitioners who have been unable to collaborate with the other sector, or who have not attempted to collaborate with the other sector. Thus, the results of the thesis may be limited to those practitioners who have successfully collaborated with the other sector. In addition, the public health practitioners included in this study were only from two public health sectors, despite the broad range of factors that influence the relationship between food and health. Therefore, further research will need to address a broader range of public health practitioners, such as those working in obesity and food-related allergies, as the public health

efforts to address these food-health issues may impact, or be impacted by, those of the food safety and food security sectors, and these food-health outcomes also play a role in the quest for improved population health.

Despite the limitations outlined above, this thesis provides an in-depth exploration of how the food safety and food security public health efforts intersect in practice, as well as the perceived barriers and facilitators faced by public health practitioners when collaborating with the other sector, including how public health practitioners in the food safety and food security sectors in BC have overcome the barriers and successfully collaborated with the other sector. As this thesis provides introductory knowledge on a complex and important public health issue that has not been extensively studied to-date, it can guide future research to identify factors that influence the success of collaborations between a more comprehensive sample of practitioners of the two sectors, identify the role that public health practitioners from sectors beyond food safety and food security have in the food and health relationship, and identify ways to support more collaborations within the province of BC. In addition, this thesis can guide Canada-wide research on how to better incorporate multiple food-health issues within public health activities, to ultimately promote the best health possible for all Canadians.

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Appendices

Appendix A: Semi-Structured Interview Guide

Introduction, Information, and Consent

Hi <NAME> - thank you so much for agreeing to participate in our Key Informant Interviews, which should take about an hour to an hour and a half.

Is this still an ok time to talk? [CONFIRM OR REBOOK]

Great! As you know, we are going to record this interview. I'm going to turn the recorder on, and then provide you with some information and record your consent, and then we'll begin the interview proper. May I turn the recorder on now?

[TURN RECORDER ON]

[READ VERBATIM]:
"As outlined in the invitation letter, we are conducting about 15 key informant interviews with individuals from the food safety and healthy eating/food security sectors in British Columbia's health authorities and the provincial government, to explore collaborative efforts between these areas. We will use the results of these interviews to make suggestions for how greater collaboration across the sectors might be supported, particularly building on the collective experiences to-date to support future efforts.

"You were provided details about the study in the invitation letter, including the voluntary nature of your participation, the confidentiality of your responses, how the information you provide will be stored and used, the potential that we may include non-identifying verbatim quotes in published materials and presentations, and your ability to stop the interview at any time, skip any questions that you prefer not to answer, or withdraw your consent at any time, all without penalty.

"As mentioned, we are audio recording this interview. So, before we begin, can you please indicate your consent to participate, including our use of anonymous quotations? If a quote may be identifying, may we contact you to obtain consent to use the quote, or suggest a modification?"

[CONSENT GIVEN, OR INTERVIEW STOPPED]

Thank you.

Interview

(LEAD–IN / EXPERTISE)

"As mentioned, our goal with these interviews is to explore ways in which the food security/healthy eating and food safety sectors have collaborated, focusing in the public health realm, in the province of B.C.

"To start, can you briefly outline your expertise and experience in this area?

[PROBE THESE THREE DOMAINS, INCLUDING ANY INTERSECTION:
→ FOOD SAFETY
→ FOOD SECURITY / HEALTHY EATING
→ PUBLIC HEALTH PRACTICE

[PROBE:
→ PROFESSIONAL TRAINING/ORIENTATION E.G. PUBLIC HEALTH INSPECTOR, SOCIAL SCIENTIST, DIETITIAN

(EXAMPLES OF COLLABORATIONS)

"As you know, we're interested in hearing about specific examples of how the healthy eating/food security and food safety domains of public health are collaborating, and really, we're conceptualizing 'collaborations' quite broadly here… from formal projects to informal interactions, past or ongoing efforts, or even attempted collaborations that perhaps didn't get off the ground or maybe haven't yet come to fruition.
So, with that broad definition in mind, can you describe any such collaborations you've been involved with?"

[IF HAVEN'T BEEN INVOLVED WITH ANY, ASK ABOUT ONES THEY MAY HAVE HEARD OF, AND POTENTIALLY SKIP TO 'ADDITIONAL EXPERTS' SECTION]

[PROBE:
→ FORMAL: e.g. PROJECTS, PROGRAMS, PRODUCTS, STUDIES, PUBLIC CONSULTATIONS, RECOMMENDATIONS, GUIDELINES
→INFORMAL: e.g. PROVISION OF AD HOC EXPERTISE, COURTESY HEADS-UP'S

[PROMPTS FOR EACH EXAMPLE:
→ IS THERE A REFERENCE, DOCUMENT, OR WEBSITE FOR THAT <PROJECT> THAT I COULD LOOK UP/REFERENCE?

→ CAN YOU GIVE ME MORE SPECIFICS ON:
-        WHAT WAS THE PROJECT ABOUT?
-        WHY DID YOU DO IT?
-        WHAT MADE YOU DECIDE TO INCLUDE THE OTHER SECTOR?
-        WHEN AND WHERE DID IT HAPPEN?
-        WHAT WAS THE TARGET POPUALTION?
-        WHAT WERE THE INTENDED OUTCOMES?

(BARRIERS AND FACILITATORS)

"You've talked about [REITERATE SPECIFIC EXAMPLE(S) OF COLLABORATIONS THAT HAPPENED] as example of collaborations that occurred. I'm curious… what kinds of things that made these activities possible, doable, maybe easier, or worth the effort, etc.? These might be the usual things, or perhaps something that was completely unexpected…"

[PROBE FOR FACILITATORS:
→ ORGANIZATIONAL
→ INTERPERSONAL
→ LEGISLATIVE, REGULATORY, POLICY
→ CRISES
→ RESOURCES
→ GOALS AND APPROACHES
→ BELIEFS, VALUES, COMMON GROUND, DIFFERENT PARADIGMS
→ THINGS THAT USUALLY GET IN THE WAY BUT DIDN'T THIS TIME

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS?

"And how about the kinds of things that might have made things more challenging or been barriers? You mentioned [THINGS THAT USUALLY GET IN THE WAY BUT DIDN'T THIS TIME]
What else could have, or did, make the collaborative efforts harder to do, blocked what you were aiming for, etc.?"

[PROBE FOR FACILITATORS:
→ ORGANIZATIONAL
→ INTERPERSONAL
→ LEGISLATIVE, REGULATORY, POLICY
→ CRISES
→ RESOURCES
→ GOALS AND APPROACHES
→ BELIEFS, VALUES, COMMON GROUND, DIFFERENT PARADIGMS
→ THINGS THAT USUALLY ARE HELPFUL BUT WEREN'T THIS TIME

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS?

"Overall, for the [REITERATE SPECIFIC EXAMPLE(S) OF COLLABORATIONS THAT HAPPENED],would you say that they were successful?"

[PROBE:
→ WHY OR WHY NOT?
→ WHAT EVIDENCE/INDICATORS DID YOU PAY ATTENTION TO?
→ ANY HEALTH OR POPULATION CHANGES?
→ CHANGES IN RELATIONSHIPS AND NETWORKS?

→ FEEDBACK FROM STAKEHOLDERS?
→ PERSONAL FEELINGS?

[PROBE:
→ WHAT WAS DIFFERENT THAT MADE YOU KNOW IT WAS A SUCCESS?
→ HOW WOULD IT HAVE LOOKED HAD IT FAILED?

"I'd like to go back to some examples you gave around [REITERATE SPECIFIC EXAMPLE(S) OF COLLABORATIONS THAT DIDN'T HAPPEN] as collaborations that didn't happen. What made these particular efforts harder to do, blocked what you were aiming for, prevented moving forward, etc.?"

[PROBE FOR FACILITATORS:
→ ORGANIZATIONAL
→ INTERPERSONAL
→ LEGISLATIVE, REGULATORY, POLICY
→ CRISES
→ RESOURCES
→ GOALS AND APPROACHES
→ BELIEFS, VALUES, COMMON GROUND, DIFFERENT PARADIGMS
→ THINGS THAT USUALLY ARE HELPFUL BUT WEREN'T THIS TIME

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS?

"And what kinds of things could have made these activities possible, doable, maybe easier, or worth the effort, etc., had they existed or been in place?
And, please, you can dream a little here, you don't have to be completely practical (!) – so, in your ideal world, what would have been in place to help you towards your goal?

[PROBE FOR FACILITATORS:
→ ORGANIZATIONAL
→ INTERPERSONAL
→ LEGISLATIVE, REGULATORY, POLICY
→ CRISES
→ RESOURCES
→ GOALS AND APPROACHES
→ BELIEFS, VALUES, COMMON GROUND, DIFFERENT PARADIGMS
→ THINGS THAT USUALLY GET IN THE WAY BUT DIDN'T THIS TIME

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS?

(OTHER OPPORTUNITIES FOR COLLABORATION)

"We've talked about a range of specifics around collaborations. I'd like to ask you to think a bit more high level for the moment, and tell me more about what you think about collaborations between the food safety/food security/healthy eating sectors overall?"

[PROBE:
→ IMPORTANT TO DO OR NOT?
→ EASY OR DIFFICULT?
→ GENERAL BARRIERS AND FACILITATORS
→ ANYTHING ELSE ON MEASURING OR DEFINING SUCCESS

"Do you see other places, projects, activities, opportunities where more or improved collaboration might be helpful or beneficial?

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS?

(COMMUNICATION – STRUCTURES, TYPES, WAYS)

"One of the themes that [DID / DIDN'T / SOMETIMES] come up in what you've described so far is communication. Can you tell me more about how communication played a role in the different things we've talked about?

[PROBE:
→ FORMAL, e.g. DATA SHARING AGREEMENTS, REGULATIONS, STANDING COMMITTES
→ INFORMAL, e.g., PERSONAL RELATIONSHIPS
→ BETWEEN THE TWO SECTORS
→ UP, DOWN, AND ACROSS ORGANIZATIONS
→ WITH YOUR COUNTERPART IN DIFFERENT ORGANIZATIONS
→ TIMING: EARLY ON, JUST-IN-TIME, STRATEGIC, TOO LATE
→ THE "PUSH": WHO YOU TOLD STUFF TO (AND WHEN? WHY?)
→ THE "PULL": WHO YOU SOUGHT STUFF FROM (AND WHEN? WHY?)

[PROMPT:
→ WHAT TYPES/STRUCTURES OF COMMUNICATION WERE HELPFUL AND WHY?
→ WHAT DID YOU WISH YOU HAD?
→ WHAT STRUCTURES WERE DETRIMENTAL AND WHY?

"Did you or your partners/organization roll out or disseminate what was going on - with respect to the collaboration - to others?

[PROBE:
→ BEYOND YOUR LHA / JURISDICTION
→ TO THE PROVINCIAL LEVEL

[PROMPT:

→ CAN YOU GIVE ME MORE SPECIFICS ABOUT HOW?
→ WHY DID YOU CHOOSE THOSE ROUTES?
→ WHAT ELSE DID YOU CONSIDER, AND WHY DIDN'T YOU GO THOSE ROUTES?

(SCALING UP / REPLICATING)

"You've given some great examples of collaborations, including why and how they may have been successful. Of course, one of the things that would be ideal is that future efforts could build on, or benefit from, lessons of what's happened to-date.
With that in mind, what advice would you give for those aiming to collaborate across these sectors, as you did?"

[PROMPT:
→ WHAT BEST PRACTICES WOULD YOU SHARE?

"Are there any efforts right now in your health authority (or elsewhere) aimed at replicating or scaling up/out from your experiences?"

[PROMPT:
→ CAN YOU GIVE ME MORE SPECIFICS ON:
-       PURPOSE/INTENT (WHY)
-       PARTNERS/PLAYERS (WHO)
-       TARGET POPULATION (WHO/WHERE)
-       STRUCTURE
-       OUTCOMES

"If the province were to create a more explicit framework to support future collaborations between food safety and healthy eating/food security in B.C., to pull out or highlight successful approaches for application by others, what would you hope it would include?"

[PROMPT:
→ WE DON'T WANT TO REINVENT THE WHEEL…
→ WHAT WOULD NEED TO BE IN IT TO MAXIMIZE CHANCE OF SUCCESSFUL SCALING UP?
→ ARE THERE PROVINCIAL LEVEL FACTORS THAT WOULD HAVE TO BE CONSIDERED THAT WE DIDN'T/COULDN'T IDENTIFY BY LOOKING AT EXISTING EXAMPLES FROM INDIVIDUAL HEALTH AUTHORITIES?

FOR THOSE WHO ID RESOURCES/$$:
→ AND IF THE RESOURCES/$$ WASN'T AVAILABLE, WHAT ELSE?

"Do you have any other comments, concerns, advice, thoughts you would like to share, about how we might encourage or support future replication of existing successes, or about collaborative public health efforts between food safety and healthy eating/food security areas in general?"

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(ADDITIONAL EXPERTS AND FURTHER/FUTURE CONTACT)

"Thank you so much for your time. Before we wrap up, I'd like to ask:

"Are there any other people you feel we should talk to on this topic?"

[RECORD NAME, ORGANIZATION, CONTACT DETAILS IF GIVEN

IF YES: "Can we mention you as the person who suggested we talk to them?"

"And if I have any further questions or clarifications about what we discussed, can I contact you via email with my questions?"

"Finally, in the future, we may wish to explore the connections between food safety and food security in additional research projects. In that event, could we contact you directly to invite your participation? I will tell you that agreeing to be contacted does not obligate you to take part in any study; you may decide if you are interested in a specific study at the time of each contact. Your name and contact details will be available only to members of my research team. This information will be securely stored in my research lab on a password protected computer for as long as we keep the data from this study, at which point the information will be deleted.   You may change your mind at any time and request that your name and contact details be deleted from our records. Please note that before any of our studies are conducted, they are reviewed and receive ethics clearance through a University of Waterloo Research Ethics Committee."

(WRAP-UP / THANK YOU)

"That was my last question; thank you so much for your thoughtful responses, and for your time today. We really do appreciate your expertise, and your participation. At this time, before we wrap up, I'll just ask if you have any questions for me?

Appendix B: Key Informant Interviews

For this thesis, I analyzed existing transcripts from 14 key informant interviews conducted by Dr. Shannon Majowicz and myself in January and February 2015, as detailed below. As a research assistant to the study, I was involved in developing the semi-structured interview guide, drafting and submitting the ethics application, and recruiting participants. I also sat in on all interviews, during which I took extensive notes.

From December 2014 to March 2015, Dr. Majowicz and I worked with the BCCDC and PHSA to develop and conduct the interview procedure. The BCCDC and PHSA were interested in exploring ways that they could better support collaborations between public health practitioners working in the food safety and food security sectors in BC. To answer this question, Dr. Majowicz and I drafted a semi-structured interview guide (Appendix A) with input from the BCCDC and PHSA. We developed the guide to explore the participants' perspectives on successful and unsuccessful collaborations with practitioners from the other sector, what factors influenced the success of the collaboration, and how they felt these collaborations could be better supported at the provincial level. We piloted this guide by conducting an interview with the BCCDC team member, and subsequently revised any questions that were unclear. Dr. Majowicz and I obtained ethics approval through the University of Waterloo Research Ethics Board (ORE#20375) prior to conducting the interviews.

We purposefully sampled individuals working in public health in BC, who had either a food safety, or food security or healthy eating focus, and who were thought to have had previous success in collaborating with the other sector. We considered 'food safety' to include practitioners working in public health agencies with an aim to reduce foodborne disease in the population, and 'food security' to include both food security and healthy eating practitioners

working in public health agencies or community organizations with an aim to increase the population's access to healthy food. Dr. Majowicz and I identified potential participants through researchers at the BCCDC and PHSA who had detailed knowledge on practitioners working in the two sectors in BC, an environmental scan of the academic and gray literature, and via snowball sampling. Of the 19 individuals we invited to participate, 14 consented, 1 declined and 4 did not respond within the interview time frame. Participants worked in five of the seven BC health authorities, three provincial-level government organizations, and two non-governmental organizations. Participants brought both front-line and management perspectives. There were five participants who brought a food safety focus, six who brought a food security or healthy eating focus, and three participants who brought perspectives from both sectors. Food safety practitioners were more easily identified by their position than those working in food security; the majority were environmental health officers, and managers and directors of health protection and environmental health departments. In contrast, food security practitioners were more diverse in their positions, working in areas such as healthy eating and access to local foods, and included community nutritionists and public health dietitians, and project leads. Eight of the participants were female, and six were male.

Dr. Majowicz conducted telephone interviews in January and February 2015, and each interview ranged in length from one to two hours. I was present during the interviews, and I audio-recorded the interviews and took extensive notes in case the audio-recordings failed or malfunctioned. Thirteen of the 14 interviews were transcribed by a professional transcription service, with the final interview being transcribed as part of this thesis work. I crosschecked and corrected all 14 transcripts against the interview audio-files to ensure proper orthography, including punctuation and non-verbal sounds that are accurate to the audio-files (Braun &

Clarke, 2006). I anonymized all transcripts by removing any personal identifiers, such as name, position, or organization.

Appendix C: Chapter 5 Analysis

I inductively analyzed the data using the processes outlined by DeCuir-Gunby et al.

(2011) and Braun and Clarke (2006), to identify factors that were facilitators or barriers to

collaborations between practitioners of the two sectors, as follows. I managed the data in

ATLAS.ti version 1.0.50 (282) (ATLAS.ti Scientific Software Development GmbH, 2013-2016).

The extensive notes I took during the interviews, and crosschecking the transcripts against the

audio-recordings allowed me to become immersed in the data (Braun & Clarke, 2006). I

developed a list of initial codes through open coding, to identify key words and sections of the

text that were relevant to understanding the facilitators and barriers to successful collaboration

between practitioners of the two sectors, following immersion in the data. I revised the initial

codes based on an inductive analysis of 7 of the 14 transcripts. I then compiled these initial

codes into a draft codebook containing the name and detailed description of the code. I

separately coded three transcripts from Merryn Maynard (who has also been trained in

qualitative research at the graduate level), and we selected quotes that we felt exemplified each

code. I used any disagreements in coding to refine the definitions of the codes, and to create new

codes. I iteratively revised the codebook (which contained code names, descriptions, and

exemplifying quotes) while coding 13 of the 14 transcripts, by refining existing codes and adding

codes as they developed. I met with Dr. Shannon Majowicz, Dr. Samantha Meyer, and Dr.

Rhona Hanning to discuss the codebook development, the coding process, and the identification

of preliminary themes. I then revised the codes and their definitions based on the input I

received during this meeting; these revisions included splitting codes apart into multiple codes,

merging codes together, and clarifying code definitions. I then used this revised codebook to

code all 14 transcripts, while continuing to iteratively revise the codebook as required. I then

arranged the codes into themes, which I further refined until all of the codes within a theme fit to that theme, and all of the themes were separate from each other, as per Braun and Clarke (2006). I revisited the data to ensure the accuracy of the analysis, and refined as required. I wrote memos throughout the coding process as outlined by Birks et al. (2008) to track questions and reflections regarding the data.