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"They hold on tight to the healthy eating, we hold on tight to our food safety, and how do we bridge that?": Determinants of successful collaboration between food safety and food security practitioners in British Columbia, Canada

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Abstract

Food safety and food security are two important public health sectors within Canada, which aim to address foodborne disease and food insecurity, respectively. While these sectors are often siloed within public health organizations, the actions of the two sectors often interact and conflict at the program level despite their common goal of improving population health. The objective of this study was to identify determinants that influenced the success of collaboration between practitioners of the two sectors in British Columbia (BC), to inform Canadian food policy. We inductively analyzed 14 interviews with practitioners working in the two sectors who had experience with successful collaboration. Data were interpreted in consultation with an inter-professional collaboration framework. Participants identified determinants at the systemic level, including the cultural, professional, educational, legislative, and political systems, which were often considered barriers to collaboration. Participants also identified determinants at the organizational level that influenced the success of collaboration between the sectors, including: the organization's structure and philosophy, leadership, resources, and communication mechanisms. Finally, participants identified interactional determinants as ways to overcome

existing barriers, including: willingness to collaborate, trust, communication, mutual respect, and taking a solutions-oriented approach. Practitioners working in food safety and food security can apply the interactional determinants identified in this study to mitigate existing barriers to collaboration and support more synergistic food policies.

Keywords: Food safety; food security; public health; qualitative research; cooperative behaviour

Introduction

There is emerging evidence that food safety and food security efforts are interconnected (Speed, et al., 2017), but what this means for food policy is unclear. Historically, efforts to improve food safety and food security have occurred separately and have been delivered by different sectors within the public health sphere. Specifically, food safety (ensuring that food is free from contamination and safe to consume) has traditionally been the purview of environmental health divisions. Food security (ensuring that people have adequate "access to sufficient, safe, nutritious food to maintain a healthy and active life" (Food and Agriculture Organization, n.d.)) has traditionally been the purview of health promotion divisions. This separation can be problematic because the policies and programs within one sector can have unintended consequences for the other sector (Speed et al., 2017). For example, BC's Meat Inspection Regulations (Food Safety Act: Meat Inspection Regulation, 2004), were developed to ensure safe meat production, but reduced the ability of remote communities to produce their own meat, thereby reducing their food security (Miewald, et al., 2015; Miewald et al, 2013).

However, there is limited research on how to support collaborations between the two sectors, to ensure that policies and other actions are not accidentally countering each other. Martin and Perkin (2016) explored how to reduce existing tensions between the sectors in Canada, finding that "communicating," "understanding intent," "educating," "understanding risk and regulations," "recognizing scale," and "enhancing partnerships" are key to reducing tensions. Our work extends these findings by identifying the factors that facilitate, or are barriers to, successful collaboration (hereafter collectively called "determinants"), between food safety and food security practitioners in BC, Canada.

Methods

We analyzed transcripts from semi-structured telephone interviews (see also Speed et al., 2017), conducted in January and February 2015 with 14 purposely-sampled key informants working in public health in BC: five working in the food safety sector (certified environmental health officers [EHOs], managers, and directors of health protection and environmental health departments); six in the food security sector (community nutritionists and public health dietitians

[hereafter called collectively "dietitians"], and project leads); and three who brought both perspectives (from positions previously listed). We obtained ethics approval from a University of Waterloo Research Ethics Committee for this project, and recruited participants through email. After receiving verbal consent, we asked participants about their experiences working with practitioners in the other sector using a semi-structured interview guide. The interviews covered multiple domains, including ways in which the food safety and food security sectors intersect (Speed et al., 2017), as well as determinants of successful collaboration between the sectors (reported here). The audio files of the interviews were transcribed, cross-checked, and anonymized prior to analysis.

We continued recruiting participants until no new concepts emerged (Guest et al., 2006). Data were inductively analyzed as per DeCuir-Gunby, Marshall, and McCulloch (2011) and Braun and Clarke (2006), and 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 determinants of successful collaboration as perceived by the participants, following immersion in the data. The initial codes were revised based on an inductive analysis of seven of the 14 transcripts and were then compiled into a draft codebook containing each code's name and detailed description. Two individuals separately coded three transcripts, and individually identified quotes that they felt exemplified each code for the sake of comparison and discussion. 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 authors provided input into the coding process and codebook development, and the codes and their definitions were then revised.

In order to identify the determinants of successful collaboration, the codes were then arranged into categories based on the inter-professional collaboration framework from San Martin-Rodriguez, Beaulieu, D'Amour, and Ferrada-Bidela (2005). The framework outlines factors influencing successful collaboration in health care teams. First are the *systemic* determinants, which "…are elements outside the organization…" (p. 134); these include the social system, the cultural system, the professional system, and the educational system. Second are the *organizational* determinants, which are the conditions within the organization; these include the organizational structure, the organization's philosophy, administrative support, team resources, and coordination and communication mechanisms. Last are the *interactional* determinants, which are the "…components of interpersonal relationships among team members…" (p. 141); these include willingness to collaborate, trust, communication, and mutual respect.

Results

Public health practitioners from the food safety and food security sectors in BC, Canada, identified a range of systemic, organizational, and interactional determinants that influenced successful intersectoral collaboration. In general, systemic determinants were more likely to be identified as barriers to collaboration, and interactional determinants were more likely to be identified as facilitators to collaboration. Participants identified organizational determinants as both barriers and facilitators to collaboration, depending on the priorities of the organization.

Systemic determinants

Participants in both sectors identified systemic determinants that influenced the success of collaboration between the two sectors; they discussed these determinants as environmental conditions that they had to navigate, and often considered them as barriers to successful collaboration. Participant accounts were indicative of all but one of the systemic determinants outlined in San Martin-Rodriguez et al.'s (2005) framework: the social system. Two additional determinants, not accounted for in the existing framework, were identified; the legislative and political systems. The systemic determinants outlined in San Martin-Rodriguez et al.'s (2005) framework and identified by the participants are provided in detail in Table 1, with their definition and quotes from participants demonstrating the impact of the determinant.

Table 1: Systemic determinants of successful collaboration between food safety and food security public health practitioners

Determinant	Definition	Exemplifying quote
From the San Martin-Rodriguez (2005) Framework		
The Cultural System	"Specific cultural values may also have an impact on the development of collaboration between professionals" (p. 134).	"[…] the huge smiles on the faces of kids as they're pulling carrots out of the garden, and eating kale flowers off the kale plants, doesn't have quite the impact on the politicians, and the media, and the people that don't have the health background that are often, or not often, but, some of those upper level that are making those decisions, it has a big impact because they don't understand that upstream population health, and the, in terms of the cost savings, that it's not as direct as the knee surgery and the cost of hospital beds, and emergency rooms visits and so on […]" [P5, dietitian].
The Professional System	"…the process of professionalization is characterized by the achievement of domination, autonomy and control, rather than collegiality and trust" (Freidson, 1986, p. 136, in San Martin-Rodriguez et al., 2005).	"[…] basically, Canada's Food Guide is a national guideline. […] For healthy eating in Canada, and provincially we use that as a tool, and everybody is implementing working towards healthier food choices. […] So, you can't trump that. You can't say, 'kids can't eat salads, because they're dangerous'" [P2, food security lead].

		"I think that it's probably not the legislation as much as the historical practice of being law enforcement type people, and that there's a lot of people that have to follow the law, and that's our job, to make sure that the law is being followed" [P9, manager, health protection/environmental health].
The Educational System	"The literature presents the educational system as one of the main determinants of interprofessional collaborative practice, because it represents the principal lever for promoting collaborative values among future health care professionals" (p. 137).	"For a lot of us working in food security where, at the community nutrition level, we have to do food safety as part of our training. I'm not sure what EHOs do around food security in their training, if anything, or what their training is around healthy eating" [P8, manager, food security].
Additional Determinants		
The Legislative System	The legislative environment mandates public health activities, which can limit inter-sectoral collaborative efforts.	"Making changes to legislation is an extremely difficult thing to do. [...] Unless there's a real political will to get it done, it moves at a snail's pace, and I'll be honest with you, to try to go through the legislative change route, I mean we'd still be, I'll say banging our head on the wall" [P14, food safety expert].
		"[...] we sent a letter to all of our facilities saying, 'regulations say all your foods have to come from an approved source. A local garden is an approved source for your vegetables,' whereas, so everybody thought they had to go to a big store to get their potatoes. Well, no, the local guy grows potatoes is good for your potato source, so, we made it an option for them to do the kind of things that they want to do" [P12, EHO].
The Political System	The short-term political environment sets the priorities regarding the health of the population, and resources are then allocated (including time, money, and personnel) according to these priorities.	"[...] 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 - 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 [...] I just don't think that long-term view is often captured when you have politicians that are making decisions about where the money goes" [P5, dietitian].
		"[...] 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 keep working away to be that thirty-year overnight success. (laughing) That's what it takes. You just have to keep plugging away and sooner or later, things change" [P11, dietitian].

Participants in this study discussed how government budgets prioritize spending on acute health care (an immediate need that is felt by the public), over disease prevention and health promotion, and both food safety and food security practitioners identified this cultural value as a barrier that limited resources available for their activities. Both sectors felt that limited resources reduced their ability to participate in collaborations, as collaborations take resources and the sectors do not have any to spare. Further, participants discussed how this cultural value of prioritizing activities that have short-term, measurable, and clear impacts over those with longer-term and more distal impacts also creates tension between the two sectors, because food safety

efforts (e.g., the Hazard Analysis and Critical Control Points [HACCP] program) often produce more immediate and clearly-linked outcomes than do food security's health promotion activities (e.g., farming workshops with school-age children):

> 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, 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]

Another cultural value that was expressed by participants in both sectors was that their own position should "take precedent" [P2, food security lead] over that of the other sector due to their own importance or legitimacy. This was a barrier to collaboration because this perception of domination limited the willingness of practitioners to work together to reach a compromise. Additionally, participants identified food safety's historical practice of enforcing legislation as a barrier to collaboration, because this enforcement was often seen as dominating and controlling rather than both sectors working together to provide healthy, safe food to the public.

The education system was identified as a barrier due to the differential nature of training of the two sectors. Food security practitioners spoke about being taught food safety, whereas food safety practitioners did not identify learning about food security (something that food security practitioners raised as an issue). This lack of knowledge on the importance of food security was seen as a barrier to collaboration and kept food safety practitioners within their silo.

The legislative system was strongly identified here as a barrier to collaboration, as follows. Participants from both sectors more easily identified food safety legislation than food security legislation, and the existence and legitimacy of the food safety legislation was the main factor underlying the perceived entitlement of the food safety sector. In addition, some participants discussed that changing legislation is a difficult and slow process. This was a barrier to collaboration because the existing food safety legislation was perceived by some participants to be prescriptive and outdated (where prescriptive legislation "…[dictates] which activities must be done to achieve a desired outcome … and necessarily involve more rigid steps and processes."; Rideout & Oickle, 2019, p. 2). This was seen to limit food safety practitioners' ability to adapt the legislation to address new food security efforts. However, while some participants believed that the food safety legislation prevented collaboration, other participants described how the food safety legislation could be interpreted to support food security initiatives while still following the law, which was a facilitator to collaboration:

> Because really, it's more about their own perception of what's allowed and what isn't allowed under the legislation, and maybe pressure from peers, that, 'oh, you let them get away with this, oh my goodness.' 'They

> need to have six sinks in there if they want to wash properly,' there's
> some, interoffice, and intraoffice comparisons [...] about what was
> allowed and what isn't allowed, and how you guide the approval process
> through that, the normal channels. [P9, manager, health
> protection/environmental health]

Finally, participants identified the political system, in particular the short-term decision cycle of elected politicians and governments, as a barrier to collaboration, because collaborations often take time before results are seen. Further, participants identified that the political will of those in power determines public health priorities, which could be a barrier or facilitator to collaboration depending on what public health efforts were considered priorities at the time.

Organizational determinants

All 14 participants identified organizational determinants as important to the success of collaborations between the two sectors. Participants discussed how having leadership that supports collaboration, adequate resources for collaborative efforts, and formalized education and communication structures in place facilitated collaboration. Participants identified all of the organizational determinants described in San Martin-Rodriguez et al.'s framework (Table 2) and did not identify any additional determinants beyond the framework.

Table 2: Organizational determinants of successful collaboration between food safety and food security public health practitioners

Determinant	Definition	Exemplifying quote
From the San Martin-Rodriguez (2005) Framework		
Organizational Structure	"According to some authors, successful collaboration between health care professionals requires a shift from traditional hierarchical structures toward more horizontal structures" (Henneman et al., 1995; King, 1990 p. 138 in San Martin-Rodriguez et al., 2005).	"[…] we would have to refer to [the food safety manager] anyway, like when [they weren't] on the [group] to begin with, we would have ideas, and suggestions, and 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 make the decision there. It just did go a lot faster" [P3, dietitian].
		"Well, it's 'out of sight, out of mind' too, and we operate in our siloes and we're out doing restaurant inspections, and checking food stores, and following up complaints and that kind of stuff, and we're busy with our own, the food safety side of things, so we don't think about some of the big pictures […] there's more to public health than just the food safety side, and I think if we're looking beyond our silo, we've got to consider these other avenues to improve public health" [P9, manager, health protection/environmental health].

Organization's Philosophy	"The organization's philosophy must support collaborative practice among professionals" (p. 139).	"[…] the culture of collaboration has to be fostered at the leadership level, and then you have to have the time to work out these things, in, kind of, ways that are successful" [P8, manager, food security].
Administrative Support	"…the development of collaboration among team members is facilitated by having leaders who know how to convey the new vision of collaborative practice" (Stichler, 1995 p. 139 in San Martin-Rodriguez et al., 2005), "…who motivate professionals to take up collaborative practice" (Stichler, 1995; Swanson, 1997 p. 139 in San Martin-Rodriguez et al., 2005), "…and who are able to create an organizational setting that fosters collaboration" (Evans, 1994; Henneman et al., 1995; Johnson, 1992 p. 139 in San Martin-Rodriguez et al., 2005).	"Well I think what made it easier is for one, having the high level support, right up to the [senior title], and our [senior title], and [their] manager […] so, when you get support at that level, you get dedicated time, staff time, devoted to working on this, and people identified instead of off side of your desk, working on something. It does become a main project. That was really helpful" [P3, dietitian].
Team Resources	"One of the key conditions for a successful collaborative practice is the availability of time to interact and of spaces to meet" (p. 139).	"[…] that's what's afforded by co-location, is that opportunity, and that ongoing camaraderie that takes away the barriers, and lets you just walk over and say, 'you know, I've been thinking about this [idea]. What do you think?'[…] you have a degree of familiarity with your co-workers, and so that allows you to ask, to be unafraid to ask something complex, or that might go against the grain" [P11, dietitian].
		"Money is important. (laughing) […] public health is a very under-funded area, and so […] this is something that we've struggled with for years, that 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 things" [P7, manager, health protection/environmental health].
Coordination and Communication Mechanisms	"Interprofessional collaboration can benefit, in particular, from the availability of standards, policies, and interprofessional protocols; unified and standardized documentation; and sessions, forums or formal meetings involving all team professionals" (Cabello, 2002; Hanson et al., 2000; Henneman et al., 1995; Johnson, 1992; Koerner et al., 1986; Warren et al., 1998; Way & Jones, 1994 p. 140 in San Martin-Rodriguez et al., 2005).	"Also, more recently we've been, 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. […] I think we all, encourage, and are happy to see, the people at a grant stage, come in and talk to us and share information" [P12, EHO].
		"So, 'we hear you that you think food safety's an issue, this is how we're going to address it. Is this okay with you? Would you, think of anything else?' So, you have a conduit of being able to identify issues and solutions in a very pro-active way" [P7, manager, health protection/environmental health].

Food security practitioners discussed how hierarchical organization structures in which the decision-making authority vis-à-vis food safety practices did not rest with front-line food

safety practitioners was a barrier to collaboration. Conversely, participants identified that involving food safety practitioners who "could make decisions on the spot" [P3, dietitian], often managers or other practitioners with authority, facilitated successful outcomes. In addition, participants discussed how the siloing of the sectors within public health organizations could be a barrier to collaboration, as it could limit practitioners' understanding of the importance of the other sector and ultimately prevent practitioners from working collaboratively with other public health sectors.

Participants discussed how the philosophy of the organization influenced how open practitioners would be to collaboration. For example, organizations that applied the legislation prescriptively, directing food safety practitioners to enforce the legislation based on typical procedures (e.g., requiring a specific number of sinks for all food operations) made collaboration difficult. In contrast, organizations that took a more outcome-based interpretation (where outcomes-based legislation "…[specifies] the desired outcome but not how to get there…"; Rideout & Oickle, 2019, p. 2) by facilitating outcome-based problem solving (e.g., using washing bins to meet sanitary requirements) facilitated collaboration. Similarly, participants noted that support from leadership was an important underlying factor of the organization's philosophy and having leaders who encouraged their team members to collaborate with practitioners of other sectors facilitated successful collaboration. However, if those in leadership positions did not promote collaboration, it was considered a barrier to collaboration:

> Just as a director came in and said, 'this [flexible/outcomes-focus] is the way we're going to do things,' somebody else could come in and say, 'no, this is the way we're going to do things. We want back to traditional [prescriptive approach], and, you guys are spending way too much time glad handing these guys [doing food security interventions], let's get out, and do some enforcement,' and that could happen tomorrow too. [P12, EHO]

Participants in this study described that face-to-face meetings and being co-located in the same office as practitioners of other sectors were more conducive to collaboration, but the current siloed environment was a barrier to collaboration. In addition, participants noted that the limited resources available to them for collaboration was a barrier, which was particularly problematic because they also identified that collaborations require adequate access to resources such as time, money, people, and spaces to meet in order to be successful. The limited resources available to participants further impacted successful collaboration between practitioners of the two sectors, as participants identified limited travel funds as a barrier to collaboration by reducing opportunities to meet with practitioners in different offices and areas of the province.

Participants in this study identified coordination and communication mechanisms, including formalized educational structures that could be put in place within public health organizations or projects (e.g., orientation procedures and training, resource documents) or could be completed by public health practitioners (e.g., workshops), as facilitators to successful

collaboration. Similarly, participants identified that enacting intersectoral protocols and practices supported collaboration between the two sectors. For example, P5 (dietitian) explained how requiring EHOs to be involved in the grant process of projects designed to provide healthy food in schools was beneficial for ensuring the success of the project:

> […] the environmental health officer actually has to sign off on the grant so that they're aware that this school is going to be doing things that are encouraging students to grow, and harvest, and get local vegetables, and fruits and vegetable into the classroom, so that we're working together on that, and it's, by having their signature on the document, it's saying, 'yes, I'm going to be there to support the schools, to ensure that the food is safe.'

These factors facilitated collaboration because having educational structures and resources available for practitioners encouraged understanding the importance of working with other sectors. Furthermore, all of the 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] which referred 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. Having "input from everyone" [P3, dietitian] was a facilitator to collaboration, as it allowed potential issues to be addressed proactively before they caused tension between practitioners. In order to get "input from everyone" [P3, dietitian], 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. Practitioners that knew who they could talk to did not recognize that some practitioners might not be as knowledgeable; therefore, they did not recognize that knowing who to engage with was a facilitator to collaboration.

Interactional determinants

All participants in this study highlighted the importance of interpersonal connections between practitioners of the different sectors for successful collaborations. Participants discussed how establishing personal connections facilitated collaborations because it promoted trust between practitioners of the different sectors, enabled problem solving, and stimulated future, larger collaborations. Here, participants identified the same determinants as outlined by San Martin-

Rodriguez et al., as well as an additional determinant: taking a solutions-oriented approach (Table 3).

Table 3: Interactional determinants of successful collaboration between food safety and food security public health practitioners

Determinant	Definition	Exemplifying quote
From the San Martin-Rodriguez (2005) Framework		
Willingness to Collaborate	"…the professionals must be willing to commit to a collaborative process" (p. 141).	"[…] I guess for me, even though, food safety, acute illness are sort of my primary mandate from a health viewpoint, […] you can look at health of the population in different ways, and whatever you can do to improve the health of someone, or a population, […] you should be willing to look at that. It might take a bit of effort, but, in the end, it'll be worth it" [P14, food safety expert].
		"I think I've just found that, over the years, just speaking to different people with different backgrounds, it just has been, yea, I guess, often pleasantly surprised, just knowing that there are other ways of doing things that are still going to result in safe food. […] And just be open to that" [P14, food safety expert].
Trust	"According to Henneman (1995), self-confidence in one's role as a professional is essential, as well as displays of trust toward other professionals" (p. 141 in San Martin-Rodriguez et al., 2005).	"[…] 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, from the food security perspective, that we do care about food safety. We don't want kids to get sick. And to understand, and that trust, I think, is there, and that collegiality can go a very long way" [P8, manager, food security].
Communication	"First, the development of collaborative practices demands that professionals understand how their work contributes to outcomes and to team objectives" (Evans, 1994; Mariano, 1989; Lindeke & Block, 1998 p. 142 in San Martin-Rodriguez et al., 2005) …"and know who to communicate the content of this contribution to other professionals" (Johnson, 1992; Mariano, 1989 p. 142 in San Martin-Rodriguez et al., 2005). "Second, efficient communication is essential, since it allows constructive negotiations with other professionals" (Henneman, 1995; Mariano, 1989 p. 142 in San Martin-Rodriguez et al., 2005). "Finally, communication is a vehicle for other determinants of collaboration, such as mutual respect, sharing or mutual trust" (Henneman et al., 1995 p. 142 in San Martin-Rodriguez et al., 2005).	"And that's something that I've found in my other parts of my work, 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.' If they're told why, and explained why, then, if it's a logical reason, especially if it's a reason other than, 'because it's in the legislation,' but there's a true food safety reason for it, then most people will kind of like, 'oh, okay I didn't know that.' […] So, they're more likely to accept it, versus just being told, 'well that's what the law says, and you've got to do it'" [P14, food safety expert].

Mutual Respect	"Mutual respect implies knowledge and recognition of the complementarity of the contributions of the various professionals in the team and their interdependence" (Bushneel & Dean, 1993; Evans, 1994; Gage, 1998; King, 1990; Mariano, 1989; Pike et al., 1993; Satin, 1994; Siegler & Whitney, 1994; Stichler, 1995; Way & Jones, 1994; Way et al., 2000 p. 142 in San Martin-Rodriguez et al., 2005).	"Say with the culled game meat, I mean we were getting requests from these municipalities or regional districts, saying, 'hey, we're having all these deers killed, and wouldn't it be nice if we could somehow process and donate the food to the local food bank, or First Nations folks or whoever,' and we're like, 'well yea that would be a good idea because it's high quality food, so let's work together and make sure that it's done safely. So that they don't get sick when they eat the food'" [P14, food safety expert].
Additional Determinants		
Taking a Solutions-Oriented Approach	Practitioners involved in the collaboration need to be able to work towards solutions, rather than focusing on prescriptive processes, to achieve an outcome.	"[…] I think you just, you kind of have to have an open mind [...] when an idea is brought forward, and look for the outcome, and how do you get to that outcome, 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 barrier to be overcome. Sometimes it's just the change in the way you do business locally, there's not a really a big increase in food safety risk, it's more about how you approach it" [P9, manager, health protection/environmental health].

Some participants discussed that the people involved in the collaboration, 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. Essential to successful collaborations was working with practitioners who are "willing to be collaborative" [P7, manager, health protection/environmental health] and who have "an open mind" [P8, manager, food security; P9, manager, health protection/environmental health] including being open to other ways of achieving safe food. Participants explained that multiple factors influenced practitioners' willingness to collaborate, including: past collaboration experiences, feeling a sense of need to address the issue or undertake the work (e.g., to address their primary mandate, to address a relevant or urgent issue), having realistic expectations and recognizing "it's better that they have something than nothing" [P8, manager, food security] (e.g., being reasonable about requirements, compromising, modifying current practices, addressing barriers, and recognizing context), understanding that collaborating with the other sector might be considered difficult or time consuming but was worth the resources because "you're going to end up with a lot better results" [P14, food safety expert], and recognizing that collaborations have a natural "lag time" [P13, EHO] and that "you've got to keep plugging away" [P11, dietitian] because collaborations "might not flow as quickly as you think" [P4, dietitian].

Not being open to collaboration was considered a barrier because it could result in not noticing opportunities even when they arise, and practitioners not being willing to work towards

a solution that worked for both sectors. Similarly, participants discussed acknowledging the fact that both health issues are connected as a facilitator, and 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. While these conflicts could be detrimental for collaborations, 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], and were considered a barrier or facilitator to collaboration depending on whether practitioners viewed the conflict as a negative outcome or as an opportunity to improve the situation.

Participants described having "a common understanding of where you want to end up" [P9, manager, health protection/environmental health] 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. Participants also discussed fear of negative food safety outcomes from food security programs as both a barrier and facilitator to collaboration depending on which health outcome practitioners were working towards. Fear of negative food safety consequences often lead to not wanting to take any food safety risks, which could be a barrier through food safety practitioners implementing more rigorous enforcement of food safety regulations, or a facilitator when fear of negative food safety outcomes motivated food security practitioners to seek food safety practitioners' input within their programs. Ultimately, understanding that both sectors were working towards the same goal of improved population health, and recognizing that the benefits of achieving this goal outweighed any difficulties they experienced, facilitated successful collaboration between the two sectors.

Involving practitioners who "really understand their scope of practice" [P2, food security lead] was a facilitator to collaboration, and included practitioners of both sectors who have an in-depth understanding of their scope of practice. Involving practitioners with in-depth understandings of their scope of practice ensured that the requirements of each sector were met, but also allowed participants to be more innovative while still addressing their public health outcome. Participants also identified wanting 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. When this trust between practitioners was lacking, it acted as a barrier to collaboration.

Participants in this study similarly stressed the importance of communicating with practitioners in the other sector, particularly emphasizing that how practitioners communicate with each other is as important as what they are communicating. Providing explanations about the importance of specific health outcomes to practitioners in the other sector was a facilitator to collaboration, because it underpinned understanding and valuing the other sector, understanding the importance of a specific project, and influencing how others work. 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. Connecting with practitioners who had already

successfully collaborated with the other sector, or who had unsuccessfully attempted to do so, was also seen as a 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. When working on a particular collaboration, those in both sectors saw connecting with individuals in the other sector early, and on an ongoing basis, as a facilitator. As P14 (food safety expert) acknowledged, 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.

Participants identified the importance of understanding and valuing the other sector (e.g., their health impact, health outcomes, risks, perspectives, mandates, culture, challenges and resources) as a facilitator to collaboration. This mutual respect was important because the fact that there were two different sectors, with different public health outcomes they were trying to achieve, was often considered a barrier that was difficult to overcome. Additionally, not understanding the other sector was a barrier to collaboration, because it could prevent practitioners from recognizing the usefulness of collaboration, and it could result in exposing vulnerable populations to hazardous food. For example, P2 (food security lead) dismissed the risk associated with *E. coli* (which causes over 30,000 domestically-acquired foodborne illnesses in Canada each year, including over 440 hospitalized cases and over 12 deaths (Thomas et al., 2015) when discussing 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."

Finally, taking a solutions-oriented approach, including "[creating] innovative, creative solutions" [P5, dietitian] and focusing on "the desired outcome" [P14, food safety expert] rather than on upholding usual processes to reach the outcome, was considered a facilitator to collaboration. Creating innovative solutions could be achieved by 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. Focusing on the outcome 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. However, P11 (dietitian) identified that the ability to implement creative solutions was dependent on context, as this ability was different in rural rather than urban settings due to urban settings often having more strict regulations that do not provide room for creativity compared to rural settings:

> I think the flexibility [to implement creative solutions] is transferrable,
> but the opportunity for flexibility may not be. Like I say, in the city,
> everyone has to hook up to the sewers, so, you can't have different kinds
> of toilets. Everyone has to hook up to the sewers. So, the creativity [to

> use different waste removal systems] can still be there, but there's no
> opportunity to act upon it. And so, that's where the challenge comes.

Ultimately, incorporating a solutions-oriented approach within a collaboration allowed practitioners to work towards improved public health outcomes, rather than upholding processes that may not meet population needs.

Discussion

In this study, we identified factors that facilitated, or were barriers to, successful collaboration between food safety and food security practitioners in BC, Canada. While participants discussed determinants at systemic, organizational, and interactional levels, there was a strong emphasis on the role of interactional determinants in supporting these collaborations. This emphasis on interactional determinants may stem from sampling practitioners working in front-line and management positions, and not incorporating individuals working at the organizational or systemic levels. However, this study highlighted actions that individual practitioners could take to support successful collaboration between the two sectors: seeking opportunities to interpret existing policies in a way that supports the outcomes of both sectors, and demonstrating these projects to their peers when they are completed successfully; and advocating for policies with a holistic view of the impact of food on population health. Overall, while the interactional determinants may have less of an impact on successful collaboration than determinants at the systemic or organizational levels, they provide actions that can be taken by individuals to enhance collaboration between the two sectors—even within contexts where factors like legislation and funding priorities may not clearly support collaboration—to synergize the programs of these sectors, and help minimize any unintended consequences on the health of the population.

This study is the first to explore barriers and facilitators to collaboration as perceived by public health practitioners working in food safety and food security. Previous research identified that "communicating", "understanding intent", "educating", "understanding risk and regulation", "recognizing scale", and "enhancing partnerships" are key to reducing tensions between practitioners of the two sectors (Martin & Perkin, 2016). Here, our results both compliment and extend these ideas to explicate further the barriers and facilitators that are experienced by individuals who have successfully collaborated with the other sector. Focusing on available assets as a solution to a health problem, rather than on the problem itself, is a strategy that has been used in public health (e.g., physical activity in disadvantaged women, according to Rütten, Abu-Omar, Frahsa & Morgan, 2009), particularly when existing barriers (e.g., limited resources) are difficult to change. Here, participants spoke to the actions that individuals and organizations can take to support more synergistic food safety and food security policies and programs within the current climate, as well as identified broader systemic barriers that could be targeted for

longer-term change. 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), in their exploration of successful adaptation of food safety regulations to small-scale operations, also identified similar factors to those identified by Martin and Perkin (2016) and to this study, specifically that relationships between the operators and inspectors, education, and "flexibility and mutual accommodation" influenced successful adaptation. In an extension of their findings, Buckley (2016) further identified "communication", "patience and empathy", "respect and consideration", and "experience and training" as important factors for successful collaboration between inspectors and operators of small-scale facilities. Buckley's work therefore provides an illustration of one of the ways that food safety and food security practitioners can collaborate to support improved population health.

While the results of this study aligned closely with the determinants of successful collaboration between different professional members of healthcare teams as outlined by San Martin-Rodriguez et al. (2005), there were four exceptions. They identified the social system as a source of power differentials between members of the healthcare team, stemming from the typical roles of physicians as decision-maker regarding patient healthcare and nurses as providing care to the patients based on these decisions (Baggs & Schmitt, 1997; Lockhart-Wood, 2000). This power differential stemming from hierarchical distributions of power within teams of healthcare professionals has been identified with other healthcare professionals (e.g., physicians and palliative network coordinators, Hermans et al., 2019; general practitioners and community pharmacists, Bollen, Harrison, Aslani & van Haastregt, 2019). However, this social system was supported in part by the laws outlining physician responsibility for patient-care (Hermans et al., 2019; Lockhart-Wood, 2000). Here, participants identified power differences as stemming from the legislative system, which was perceived as prioritizing food safety over food security. The existence of food safety legislation that mandates food safety activities to prevent foodborne disease, and the lack of an equivalent for food security, often resulted in more support for food safety practices than those of food security in situations where the goals of the two sectors were in conflict. To minimize the power differentials experienced between practitioners of the food safety and food security sectors, our participants highlighted that focusing on solutions (rather than on following process) was a key interactional determinant, in addition to the willingness to collaborate, trust, communication, and mutual respect that had been previously identified. This additional determinant allowed participants to overcome existing barriers, by working to achieve the intended outcomes of food safety legislation without focusing on outdated and prescriptive methods, and provided an opportunity for practitioners to work on practical solutions for new projects and in new settings while maintaining food.

Our participants also identified another new systemic determinant, the political system, in particular its short-term decision cycle, which often acted as an additional barrier. According to Hoffman, Creatore, Klassen, Lay, and Fafard (2019), short-term decision cycles are considered barriers because "[in] order to maintain and build electoral support, politicians need projects and

policies that are visible and have demonstrable effects within their time in office. Democratic politics can create political realities that favour short-term 'quick wins' over long-term sustained impact." (p. 271). This is problematic because the health impacts and cost-savings of public health efforts are often not seen until after the politicians in power have left their office, and thus may not be seen as a priority (Hoffman et al., 2019; Masters, et al., 2017). Additionally, successful public health efforts prevent future disease, which can be hard to attribute to any one intervention, further deprioritizing public health activities (Hoffman et al., 2019). The political system also served to create further tension between the food safety and food security sectors, as the impacts of actions undertaken to reduce foodborne illness were easier to demonstrate than the impacts of the actions undertaken to reduce food insecurity. Ultimately, political will is often not aligned with public health efforts, which was often considered another barrier that participants had to overcome or take into consideration when undertaking their public health actions.

This study is subject to several limitations. First, our participants may not be representative of all practitioners working in the food safety and food security sectors in BC. Here, all participants had successfully collaborated with practitioners of the other sector, so the facilitators and barriers identified here may not be the same as those felt by practitioners who have been unable to successfully collaborate. In particular, this study may underemphasize the extent to which barriers affect collaborations. In addition, our participants were all mid- to late career, meaning this study may not accurately depict the factors experienced by early career practitioners. Buckley (2015) identified that younger inspectors were less collaborative than more experienced inspectors, so early career practitioners may experience the facilitators and barriers identified here differently, or may experience different facilitators or barriers altogether. To support collaboration between early career practitioners, the food safety curriculum should incorporate food security, healthy eating, and interprofessional collaboration training. Ultimately, better understanding 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 is needed. Finally, as recognized by our participants, food safety and food security deal with issues, and are driven by factors, that are dynamic. Thus, these results may be most applicable to the current context. However, many of the facilitators identified by participants, particularly at the individual and organizational levels, are factors that require ongoing engagement to sustain, such that they should be able to adapt to changing food safety and food security landscapes.

Despite these limitations, this study addressed a gap in the literature by providing the first in-depth exploration of factors that influenced the success of collaborations between practitioners of the food safety and food security sectors. Importantly, because we explored the perspectives of those who successfully collaborated with the other sector, our findings highlight ways individuals can overcome existing barriers to intersectoral collaboration within the current context, to more successfully improve the health of the population. In addition, these findings may be applicable beyond the food safety and food security sectors, to collaborations with other public health – or even non-health – sectors where collaboration is important, and where there

are competing priorities, differing approaches, real or perceived power differentials between practitioners of different sectors, or where legislation has the potential to impact hard to measure activities.

Conclusions

This study identified that a range of systemic, organizational, and interactional determinants influenced successful collaboration between food safety and food security practitioners in BC, Canada, with systemic determinants most likely to be barriers, and interactional determinants most likely to be facilitators. More research is needed to (1) explore the full range of facilitators and barriers felt by public health practitioners of these two sectors, (2) incorporate a broader range of perspectives (e.g., early career practitioners), and (3) 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.

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