The Whole Systems Approach to Obesity and Non-communicable Diseases: Implications for Research, Policy and Practice

by

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Abstract

Obesity and non-communicable diseases (NCDs), significant threats to population health, are widely understood to be embedded in complex systems of interdependent causal factors. As such, researchers, policymakers and practitioners have become increasingly interested in systems-wide approaches that have the potential to reduce the burden of these diseases. Outcomes of this trend include the development and application of new systems science methods, and a turn towards multi-sectoral collaborative engagement as a key directive for influencing systems.

This dissertation explores these aspects of the whole systems approach to obesity and NCDs through three original research papers. In the first, a novel systems science framework is employed to analyze recommendations drawn from 12 documents aimed at influencing obesity planning. Results show that many of the documents focus on changing the determinants of energy imbalance and lack planning at higher levels of system function, such as interconnections between system elements and goal setting. This paper demonstrates the utility of systems science frameworks for introducing systems thinking into policy-level planning in a manner accessible to public health stakeholders.

The second and third papers turn to the subject of multi-sectoral partnerships. The first of these represents a review of the role of public health partnerships with the private sector in addressing obesity and NCDs. Contemporary challenges around working with the food and beverage sector are considered through a systems-informed lens that pushes traditional thinking about conflict of interest and the role of monitoring and evaluation activities related to partnership engagement. The following chapter presents an exploratory qualitative study of federal governmental public health staff's experiences working to develop co-funded multi-sectoral partnerships. Findings highlight the opportunities and challenges that emerge from government efforts to shift relations with traditional and novel partners in an effort to leverage partnerships for system change. Suggestions for how program implementers can take dynamic system attributes such as capacity, trust, and power relations into account when implementing multi-sectoral partnership programs are also offered.

Finally, this dissertation concludes with a critical reflection on the research findings in light of the whole systems imperative and its implications for the public health response to obesity and NCDs.

Keywords: obesity; non-communicable diseases; complexity; systems; partnerships; public health; whole systems approach

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List of Acronyms

BMI	Body mass index
CLD	Causal loop diagram
COI	Conflict of interest
CSP	Cross-sectoral partnership
GMB	Group model building
ILF	Intervention Level Framework
IOM	Institute of Medicine
LOI	Letter of Intent
MSP	Multi-sectoral partnership
PHAC	Public Health Agency of Canada
PHSA	Public Health Service Authority
RD	Public Health Responsibility Deal
SSB	Sugar sweetened beverage
WHO	World Health Organization
WSA	Whole systems approach

Chapter 1.

Introduction

1.1. Background

Obesity and related non-communicable diseases (NCDs) have emerged as one of our most pressing health concerns. In 2016, more than 1.9 billion adults were overweight; of these, over 650 million were obese (1). Global obesity has nearly tripled since 1975, and while there is evidence that rates have plateaued in some regions, they continue to grow in others and maintain a high prevalence worldwide (2). NCDs that are associated with obesity and share common causes are also at epidemic levels and stretching the resources of heath care systems around the world. Cardiovascular disease, cancer and diabetes are responsible for more than 41 million deaths annually, with a third of those occurring before 70 years of age (3). Reductions in obesity and NCDs, however modest, would prevent the loss of tens of thousands of person-years of life, and improve the quality of life of millions worldwide by lessening years lived with disabilities attributable to these conditions (4).

The research in this dissertation is primarily relevant to high-resource settings, as it does not adequately account for the unique challenges that obesity and related NCDs present for lower-resourced societies. In high-resource contexts, much of the responsibility for the NCD and obesity epidemics has historically been laid at the feet of individuals and their decision-making around diet and exercise (5,6). Within this frame, public health has favoured health education initiatives, guided by the assumption that informed individuals make better, healthier decisions. The latter part of the 20th century saw the emergence of perspectives recognizing the broader determinants of individual behaviour. These ecological models situate individuals within community, cultural, economic and other relevant contexts that shape their decision-making on a regular basis (7). Within these frameworks, public health has turned its interest in obesity and NCD prevention towards multi-level interventions, and to factors such as income disparity, urban planning, and the forces that affect healthy food availability. Public health organizations have also extended their role to include advocacy for healthy

policies that have the potential to shape the environments in which people live, learn, work, and play.

The past two decades have seen yet another evolution in the organizing frameworks used to understand and address the problems of obesity and NCDs. A complexity turn has occurred in public health wherein obesity and NCDs are seen as emergent products of systems whose interactive, dynamic and adaptive natures make attempts to predict and control activities within them challenging, if not impossible. Subsequently, there has been increased interest in a whole systems approach (WSA) that shifts focus away from individuals as points of intervention and towards the systems in which they live. Researchers, policymakers and practitioners are adopting new ways of thinking that integrate a systems lens and compatible methods into their work. The WSA also provides a strong rationale for governments and policymakers to pursue multi-sectoral partnerships (MSPs) in order to leverage the strengths and resources of a diverse range of actors who have influence over systems. These conditions raise a host of questions which, for the purposes of this dissertation, I situate under this broader one: how might systems thinking and multi-sectoral partnerships best serve efforts to shift whole systems towards more favourable health outcomes?

This dissertation represents my efforts to engage with this question through three original research papers. The first examines the practice of population level planning for obesity through the application of a systems-based framework. The second reviews the implications of government and non-profit partnering with the private sector, particularly the food and beverage sector, as part of a systemic response to obesity and NCDs. The third stays in the realm of multi-sectoral collaboration but moves to the level of practice, examining federal government staff's experiences as they developed co-funded multi-sectoral partnerships under mandates informed by a complexity lens. While the three articles differ in focus, their conclusions speak to common themes related to the whole-systems imperative and its implications for the public health response to obesity and NCDs. I reflect upon these in this dissertation's fifth and final chapter, and point to possible future avenues of exploration. First, however, I review public health's emerging interest in systems approaches in more detail and consider the ways in which the WSA has informed public health's approach to obesity and NCD prevention. I conclude this introductory chapter by overviewing my personal orientation to research practice and

how it has informed the approaches taken in the three manuscript chapters that make up the heart of this dissertation.

1.1.1. The complexity turn in public health

The notion that obesity and related NCDs are problems emerging from complex systems can be situated as part of a broader trend taking place in public health, wherein the field has acquired an interest in adopting the approaches, methodologies and tools developed to study and intervene in complex systems. The complexity and systems sciences have a long intellectual heritage, spanning from their mid 20th Century origins in the life sciences through to a diverse and expanding range of disciplines (8,9). The field is also characterized by what Peters (9) aptly refers to as a "thick jungle of terminology" that can be sometimes be employed as widely applicable frameworks and lenses, and at others very specifically to describe particular phenomena. The approach taken in this dissertation is most closely aligned with the area known as *systems thinking*, which at its core is interested in "seeing how things are connected to each other within some notion of a whole entity" (9 p1). Donella Meadows, a seminal scholar in this area, defines a system as "a set of elements or parts that is coherently organized and interconnected in a pattern or structure that produces a characteristic set of behaviors, often classified as its 'function' or 'purpose'" (10 p188). Systems thinking has also been framed as a *reaction*—an attempt to address the perceived limitations of reductionist scientific approaches for engaging with complex problems by reinventing our approaches to policy and intervention (11). The applied study of events through this systems lens, using the methods and approaches developed with this specific interest in mind, is referred to as *systems science* (12).

Systems science is closely linked with complexity science and the study of complex adaptive systems—that is, systems that have specific characteristics including the ability to adapt, evolve and produce emergent outcomes that are greater than the sum of their parts (10,11). Originally rooted in the study of natural systems and an interest in chaos theory, complexity science is concerned with the uncertainty and unpredictability associated with dynamic interactions occurring in systems that bear the hallmarks of complexity (13). These characteristics include: a high degree of variation among system variables and structures; the presence of nonlinear relationships between causes and effects; the presence of feedback loops and interdependencies among

system variables; and the ability for the system to adapt and self-organize (14). Glouberman and Zimmerman (15) present a helpful, plain-language analogy for understanding how the presence of complex characteristics introduces unique challenges. Baking a cake and sending a rocket to moon are presented, respectively, as *simple* and *complicated* tasks; while they differ in their level of difficulty and the stakes involved, they are similar in that the correct application of a standardized formula should result in a successful outcome. Raising a child, on the other hand, presents a *complex* problem for which no standardized formula exists, and for which experience and expertise can only offer so much assistance in light of the unique set of conditions presented by each child. This complexity frame has challenged biomedically grounded public health paradigms that assume approaches that work to address simple, or even highly complicated, situations will serve to address complex scenarios. Furthermore, evidence suggests that interventions relying on individuals—highly complex points of intervention in their own right—to adapt their behaviour in complex social environments rarely succeed in ways that will produce sustainable, long-term results (16–18). Interest has thus turned to systems as potentially more fruitful points of intervention, and scholars have called for a paradigm of public health research and practice that is flexible, adaptive, and grapples with the complexity of our most pressing public health problems.

The past two decades have thus witnessed a boom in the institutionalization of systems science to address complex public health problems, as reflected in the founding of the Initiative on the Study and Implementation of Systems and its influential work on tobacco control, and the naming of systems science as a key programmatic direction for the Office of Behavioral and Social Sciences Research at the National Institutes of Health. Diverse methods such as social network analysis, systems dynamics modeling, agent-based modeling, and causal loop diagramming have been employed in support of public health issues such as health disparities, tobacco control, HIV/AIDS, and mental health (19–27). Systems approaches have also been utilized to support and interrogate a range of public health related activities, including but not limited to planning, program design and implementation, knowledge mobilization, policy design and analysis, and evaluation (12,28–32). Taken as a whole, these developments represent a shift in interest towards understanding phenomena in relation to the systems in which they are embedded, the search for responses that grapple with complexity, and the development

and application of methods that are suited for this task. In the following section I consider these trends as they are represented by the WSA to obesity and NCDs.

1.1.2. The whole systems approach to obesity and NCDs

The WSA has become a popular guiding framework for directing the public health response to obesity and NCDs, with the World Health Organization, Institute of Medicine, and other leading health organizations recommending WSAs as part of an effective public health response to these complex problems. The “whole systems approach” (sometimes referred to as the whole *system* approach or whole-of-system approach) can be used to describe a collection of integrated and comprehensive interventions—complex in their own right—that aim to change community systems by targeting individuals, groups and community-level environments and policies (18). While a shared definition or model of what this should look like in practice is lacking, experts have identified a group of activities that have come to represent the approach. In an evidence review produced for the UK’s National Institute for Health Care and Excellence, Garside et al. (33) suggest that WSAs for obesity include the identification of a system and its boundaries, capacity building, establishing relationships and strong methods for communication across the system, embedding action and policies within organizations, and developing leadership throughout the system.

Another conceptualization of the WSA, and one most directly relevant to the work in this dissertation, is that suggested by the Foresight obesity systems map and its accompanying report (34). The highly influential “map” is actually a causal loop diagram (CLD) developed through consultations with stakeholder and experts in the United Kingdom. Consisting of 108 variables and approximately 300 causal links, the map was the first high profile effort to create a CLD for the causes of obesity. Since its publication the map has helped to shape discourse about causality and individual responsibility among public health researchers and policymakers, and has popularized the concept of a whole systems approach for policymakers (35). Public Health England recently collaborated with a research team from Leeds Beckett University to design an obesity prevention strategy informed directly by the Foresight map. Having reviewed literature related to the WSA, the research group suggests that core elements of the approach should include: recognition of obesity’s complexity and the need for a cross-sector approach; bringing together partners that have a role to play in the obesity system; and

employing systems science methods to identify causal factors and changing dynamics (36). Drawing from this work I employ the term “whole systems approach” more broadly as an orientation to thinking about and acting upon complex problems through a systems thinking lens. This conceptualization reflects an interest in applied systems science methods, but also serves as a reminder to pragmatically consider findings from this practice in relation to the broader hopes and goals for affecting the system under study.

The WSA aligns with the various socioecological frameworks that have guided public health for the past few decades (7,37,38). Socioecological approaches share an interest in situating individuals within the interacting broader layers of social context that inform their behaviour (39). For McLeroy et al. (7), the identification of these influences represents an overt attempt to move away from a “victim-blaming” ideology present in health promotion, wherein individuals are considered responsible for their health outcomes regardless of extenuating systemic circumstances. Upstream models of care and the social determinants lens have similarly shifted attention away from individuals and towards the systems that shape their behaviour (40,41). Systems science has been positioned as a complimentary approach to socioecological models and a means of expanding our understanding of the dynamic interactions that take place both within and between contextual layers of influence (42). Systems science methods and outputs, such as the Foresight map, also have the potential to further the cause of socioecological models by providing visual heuristics that communicate complexity and the role that feedback mechanisms play in system behaviour.

Adopting a WSA to obesity and NCDs presents several implications for public health, both theoretical and practical. The research in my dissertation touches upon several of these issues as they relate to two broad areas of public health activity that have been influenced by the growing popularity of WSAs as a means of addressing obesity and NCDs. The first of these relates to the need to practically utilize systems thinking and systems science methods to support the WSA. While significant progress has been made in research to support systems approaches, some suggest that—as a whole—the field has failed to live up to its expressed potential in practice and remains, at best, a useful explanatory and descriptive tool (20,43,44). A recently conducted systematic review of systems science applications for public health suggests a gap still exists between rhetoric and reality, as it found that the majority of articles identified were position pieces extoling the benefits of the practice but offering little in the way of

practical content (20). The challenge of operationalizing conceptual models such as the Foresight map persists, and is accompanied by the task of not becoming overwhelmed by the complexity it represents and retreating to safer, more familiar terrain. Furthering our understanding of the WSA from a variety of perspectives is necessary for identifying practical and appropriate approaches to complex problems, and to help steer public health out of the "lifestyle drift"—a return to individually focused efforts—it currently finds itself in (45).

A second central WSA-related theme that guides my research is the drive to collaborate across sub-systems in order to address complex problems. Public health has a long-standing interest in collaborative relationships for the purposes of health promotion at the community level. Health in all policies and whole-of-government frameworks have also necessitated relationship building to overcome siloed ways of working within government, while public-private partnerships have been utilized to leverage private sector resources and influence private sector organizations towards more public health friendly practices. The WSA similarly positions collaboration as an essential means of helping to move health promotion efforts past a focus on individuals, increase alignment between system sectors towards healthier goals, and improve knowledge exchange between actors who might influence population health. However, as the call to partner as a response to complex programs becomes more popular, skeptics question the limited evidence as to their effectiveness in achieving their stated purposes (46). "Complexity" has also been employed as a rhetorical device to justify the involvement of the private sector in obesity and NCD prevention, in turn raising significant concerns regarding the adverse influence that corporate actors play in informing public health policy (47). The WSA lens is useful here in pushing our thinking about partnerships beyond the immediate outcomes of specific collaborative efforts as a barometer for their need or effectiveness, and towards their broader implications for the aims of the system as a whole.

1.2. Challenges and opportunities for research supporting the WSA

While a comprehensive review of issues pertaining to research to support the WSA is beyond the scope of this chapter, two themes emerging from relevant literatures have been particularly influential in my thinking and approach to study in this area.

These pertain to questions around the nature of evidence within a complexity paradigm, and the benefits and challenges of applying different types of systems science methods to support policy and program development to address obesity and NCDs.

1.2.1. Rethinking evidence for complex policy problems

The complexity turn in public health has surfaced a number of issues related to evidence, particularly in relation to what constitutes valuable evidence for guiding policy design within a systems context. The *evidence-based* paradigm that informs most policy design is traditionally reliant on reductionist scientific approaches, which in turn privileges research on individuals conducted in controlled situations (48). This evidence has limited applicability to system-wide interventions and policy design as it fails to adequately account for dynamic conditions and context. Several scholars have questioned the positivist evidence-based policy paradigm and put forth complex approaches as a "useful counter-balance to the weaknesses in reductionist perspectives, and potentially over-optimistic reliance on evidence-based medicine" (43 p2). However, producing evidence from the study of complex systems presents its own challenges. Cause and effect is difficult to establish due to systems characteristics such as nonlinearity, time delays and feedback loops. Implementing new conceptualizations of evidence for the purpose of informing policy is also limited by the pragmatic reality of policy-making itself. Government and policy landscapes are in themselves complex systems—contested terrains influenced by a broad range of contextual factors of which scientific evidence is just one, and not always the most valued (49). While systems thinking frequently points to government's need to be more adaptive and adoptive of a learning culture, Rittel and Webber (50) astutely note in their overview of "wicked" problems that decision-makers are not granted the same right to fail that researchers are. These conditions pose significant challenges for those interested in infusing more systems-friendly evidence into public health practice.

Having said that, scholars have identified ways in which we might shape public health's relationship with evidence so it better aligns with complex systems approaches. Moving from an evidence-*based* paradigm and towards an evidence-*informed* "learning model of policy making," as suggested by Sanderson (49), could help reposition evidence as part of a broader learning strategy that acknowledges policy and experimental programming as the natural experiments they are. Tacit practitioner

knowledge presents a frequently untapped source of context-specific evidence (49); if captured, it has the potential to provide critical feedback to decision-makers as to the effects of their efforts. Researchers should also follow recommended systems thinking practice to seek out evidence of unintended effects, both positive and negative, such that decision-makers can identify unexpected costs and benefits—tangible and intangible—associated with specific approaches. This perspective aligns with the proposition that, from a systems-thinking lens, evidence related to complex problems needs to better account for social context (44). The complex systems that produce obesity and NCDs are intimately tied up in social norms and values, media messaging and other discursive practices that impact individual behaviour (6). In the case of obesity—a stigmatizing condition—there is also the potential to cause harm and damage to mental and physical health through misguided interventions (51). Taking in the full scope of these social conditions will require the employment of a diverse range of methodologies, the subject of my next theme.

1.2.2. Expanded use of soft systems methods and thinking

The broad range of methods, tools and frameworks that support the WSA can be roughly separated into two broad categories—“soft” and “hard”—which in turn can be classified as qualitative and quantitative. Hard systems approaches assume systems can be studied objectively through quantitative measures, such that they might be more easily regulated (52). Computational and dynamic modelling methods have produced descriptive models of real-world systems and complex events, and been used to create predictive simulations to inform policy making. However, scholars have pointed to the limitations of hard systems approaches in the service of highly complex, socially embedded problems such as obesity and NCDs. Coyle has questioned the higher standing attributed to quantitative modeling practices, particularly when system uncertainty precludes their accuracy (53). In their review of systems science applications to public health, Carey et al. (20) found that the poor quality of reported methods in many computational modeling studies raised questions about the current quality of the field. Another challenge of hard systems approaches is their inaccessibility to many decision-makers and practitioners, given their cost and required level of high technical expertise (25).

Researchers are increasingly indicating that qualitative, soft systems methods might be best suited to the purpose of exploring social systems (20,53,54). They have been identified as having potential in expanding our understanding of said systems, a necessary step towards identifying root problems and anticipating how actions in one area might impact others. Soft systems approaches are also said to align well with current debates regarding knowledge translation and public health policy (20) and can help systems analysts take wider influences into account (55). They have the additional benefit of being more accessible than most hard systems approaches, thereby having the potential to be embedded into public health systems more broadly, including into policy and intervention design. If successfully taken up, systems thinking approaches should move actors away from thinking about interventions in term of lists of factors, and towards operational thinking that considers how interventions work in combination with one another and in interaction with their context (47).

The research in this dissertation aims to contribute to these conversations regarding evidence and methods by:

- Examining the utility of an accessible, soft systems framework for infusing systems thinking into obesity and NCD prevention.
- Situating public-private partnerships in relation to broader systems considerations as a means of assessing their value for public health.
- Employing qualitative methods to capture tacit knowledge about multi-sectoral engagement in a manner that accounts for process, context, and unintended consequences.

In the following section I expand on how this work was conducted by reviewing my general orientation to research and its relation to the methodologies and approaches that were employed in this dissertation.

1.3. Dissertation overview

1.3.1. Positioning myself as a researcher

When conducting research it is essential the investigator—themselves a research instrument—carry with them an awareness of their philosophical orientation, intellectual priorities, and potential biases. My ontological stance, or intellectual

worldview, has been informed by my background in communications theory and study, which emphasises the social construction of reality through language and negotiated discourse. Epistemologically, social constructionism assumes a critical stance towards taken for granted knowledge, suggests that knowledge is sustained by social practices, and recognizes its culturally and historically specific nature (56). I have also been influenced by critical theorists in this field and their attention to power dynamics, particularly as enacted out through language and representation. In regards to public health, this has manifest in an interest in the ways in which diseases are not only biological, but are socially constructed and attached to popular narratives and metaphors in ways that have real-world consequences through the prioritization of resources and decisions regarding policy. I have found this perspective to be particularly useful in interrogating competing models of obesity and NCDs, and their limitations for considering these physical conditions as they intersect with the complex social realities that drive them.

I am also influenced by pragmatism, an approach philosophically congruent with social constructionism, but which offers a solid counter to the trap of relativism that accompanies a worldview in which reality is largely a subjective experience (57). Pragmatism is explicitly concerned with evaluating beliefs or concepts in relation to their practical consequences; as such the test of validity of knowledge is the extent to which it improves conditions (57). Like social constructionism, it also suggests that knowledge is provisional and situated historically and culturally; it is “true” only “for a period of time and in the context that it is agreed to be useful” (57). As such, this approach privileges continuous learning and reflection, and assessment of evidence as it remains relevant to current contextual conditions. I am particularly fond of Sanderson’s observation that pragmatism, as formulated by Dewey, calls for a "capacity to apply knowledge to guide us in taking appropriate action in an ethical-moral context where values and ends must be explicitly considered – extended to incorporate the ends of our actions” (49 p710).

Given these influences, my interest in the systems sciences has naturally turned towards soft systems approaches, which represent an interpretive, learning-oriented lens wherein systems models or frameworks are considered intellectual constructs to help further the exploration of problems and their potential solutions (58). Checkland (58) makes a key and relevant distinction between hard and soft systems approaches that emphasizes the role of the researcher rather than the nature of the system under study.

In the former, the observer observes a systemic outside world and pronounces “I spy systems which I can engineer.” The soft systems approach, on the other hand, situates systemic inquiry with the observer’s mental models, leaving them to declare, “I spy complexity and confusion, but I can organize exploration of it as a learning system.” This conceptualization of the researcher acknowledges the subjectivity of their observational stance. This in turn requires a conscious attention to reflexive practice during all stages of the research process, such that the investigator might hold up their findings for interrogation and acknowledge their subjective role in knowledge construction. Trochim et al. (59) also highlight the necessarily subjective act of boundary definition that occurs when studying systems, noting that, “contrary to popular claims, systems thinking encompasses and includes reductionism, rather than replace or reject it” (p 540). In other words, identifying boundaries around an object of study is, by necessity, a reductive act with its own implications. Such is the ongoing challenge of engaging with whole systems. As Samuel Butler (60) noted in the 19th century:

> Everything must be studied from the point of view of itself, as near as we can get to this, and from the point of view of its relations, as near as we can get to them. If we try to see it absolutely in itself, unalloyed with relations, we shall find [that we have] whittled it away. If we try to see it in its relations to the bitter end, we shall find that there is no corner of the universe into which it does not enter (p373).

In the following section I review the approaches I have employed to better understand one small corner of the universe.

1.3.2. Research overview

Chapter 2: Systems science and obesity policy: a novel framework for analyzing and rethinking population-level planning

This study was produced at a time when obesity, and childhood obesity in particular, was galvanizing the public’s interest. A June 2008 Time Magazine Cover represents the tone of the era well: an overweight child holding a double scooped ice cream cone stands on a skateboard bending under his weight. The accompanying headline and byline read: “Our Super-Sized Kids: It’s not just genetics and diet. An in-depth look at how our lifestyle is creating a juvenile obesity epidemic—and the scoop on how to cure it” (61). The image and message represent several questionable aspects of the framing of the obesity epidemic that were evident at that time, including fat-shaming

imagery of a gluttonous child, and the reductionist message that there was an available "cure" for an epidemic that had taken decades to emerge. While this public discourse was not the focus of our study, I feel it is worth acknowledging the broader environment in which our work took place and the impact it had on my thinking at the time.

Our study was interested in whether or not the systems approach being popularized by the Foresight map was making its way into strategies and guiding frameworks for obesity prevention. We employed the Intervention Level Framework (ILF), a tool developed by Malhi (62) as part of the work conducted by Dr. Finegood's Chronic Disease Systems Modeling Lab at Simon Fraser University. The framework reduces Meadows' identification of 12 places to intervene in systems to 5 more manageable levels that address the paradigm and goals guiding the system, the interconnectivity between system elements, and the individual elements themselves. The study served to further test the utility of the ILF in different contexts than it had been previously employed, in this case by applying it to population level policy planning for obesity prevention. By combining the ILF with a coding taxonomy based on the Foresight map, we utilize a quantitative approach to demonstrate where policy attention was being directed, and at what level of system function. By following this with qualitative techniques borrowed from framework analysis, we further demonstrate possibilities for future policy design to better incorporate systems thinking. The paper thus serves as a guide for integrating systems thinking into planning and strategizing for complex public health problems, perhaps helping in the effort to move decision-makers away from "list" thinking and more towards systems-friendly operation ways of thinking. Our final analysis also links back to the thread introduced in the previous paragraph regarding the obesity frame, as we consider how goals implemented in support of guiding paradigms should be enacted with social context as a consideration.

Author contributions: I conceptualized the study and analysis plan with Diane Finegood and Carrie Matteson. I conducted data collection and coding with the help of a research assistant (Karen Tulloch) and prepared the manuscript. Carrie Matteson, Diane Finegood and myself contributed to the interpretation of results as well as manuscript revision and editing. My overall contribution to this manuscript was 80%, while my co-authors contributed the remaining 20%.

Chapter 2 has been published in the American Journal of Public Health.

Chapter 3: Cross-sector partnerships and public health: challenges and opportunities for addressing obesity and non-communicable diseases through engagement with the private sector

Similar to the previous chapter, this review of issues related to working with the private sector on obesity and NCDs was published at a time of significant debate in the area. Much of this was related to the role of the food and beverage sector, who have employed similar tactics to those developed by the tobacco industry in response to regulatory efforts to shape their practices. However, whether or not to engage with the food and beverage industry presents a more difficult test case than does tobacco. Whereas tobacco is an easily vilified industry and a product that offers cessation as an option, we are reliant on the food and beverage industry for survival. Furthermore, the food and beverage "industry" is in fact a diverse collection of local to transnational players operating in areas related to production, consumption, distribution, marketing and so on. As such, blanket generalizations about whether or not the industry is "friend or foe," as the debate is frequently presented, are not helpful.

As a means of thinking through issues related to engaging with private sector partners, we again introduce the ILF, this time as an organizing framework for thinking through policy issues from a broader systems perspective. In doing so we are able to expand upon our overview of issues related to partnership working and examples drawn from the field. Situating common issues related to cross-sectoral engagement within this lens, we offer analysis on how factors such as trust, conflict of interest, and monitoring and evaluation processes can be addressed to consider partnership-related policy debates in relation to public health's broader system interests. To this end, we also employ a critical lens to consider the discursive implications of employing "partnership" to describe a wide range of collaborative efforts.

Author contributions: This review was produced in response to an invitation from *Annual Review of Public Health.* I conducted the initial literature review to inform the paper's first draft. Diane Finegood and I collaborated on writing the manuscript. I assumed the lead in responding to peer review comments and editing the manuscript in response. My overall contribution to this manuscript was 70%, while my co-author contributed the remaining 30%.

Chapter 3 has been published in *Annual Review of Public Health*.

Chapter 4: Developing co-funded multi-sectoral partnerships for chronic disease prevention: a qualitative inquiry into federal governmental public health staff experience

This study originated from consultations with the Public Health Agency of Canada (the Agency), via the Propel Centre for Population Health Impact at the University of Waterloo. The Agency had recently implemented a new approach for allocating funding to applicant organizations for chronic disease prevention efforts—the *Multi-sectoral Partnerships to Promote Healthy Living and Prevent Chronic Disease* initiative (the MSP Initiative). The MSP Initiative and its design related to several themes that had emerged during my previous work. For one, it presented common rationales for partnering with the private sector to address complex public health problems. The MSP initiative also operated as partnership program but in a funding context, thus speaking to issues raised in Chapter 3 regarding the varied deployments of "partnership" in public health contexts. The Agency had implemented a learning and improvement strategy as part of this program, and were interested in gaining a better understanding of what took place in the time frame between which ideas for interventions were originally brought to the Agency's attention and their submission for final funding approval. During early consultations about this research, Agency staff referred to this time frame as a "black box"—a metaphor representing their own lack of clarity around what exactly it was that they *did* during this time frame, in part because the program provided such novel and flexible working conditions for a government setting.

Given this context, an inductive, qualitative approach was employed to surface and document Agency staff's tacit knowledge regarding multi-sectoral partnership development in these specific working conditions. Drawing on methods suggested by Ambrosini and Bowman (63) to operationalize tacit knowledge, we asked Agency staff to share their stories, positive and negative, about their experiences brokering MSPs. As Goodall (64) notes, narrative serves a unique epistemological purpose in conveying what an experience "is like," in ways that other methods cannot. Narrative also proves useful for describing sequences of events and the perceived connections between them, thus helping to move the researcher towards a temporal understanding of data captured at a fixed place in time. To further move our analysis toward an understanding of staff experiences in context we adapted Strauss and Corbin's (65) coding paradigm approach. The coding paradigm further moves the researcher towards representing the processes by which study participants navigate recurring events—how they experience

them and develop strategies in response. The result of our approach was a rich depiction of staff experiences, from which we developed a model that can serve to inform decision-makers and practitioners considering this program type as part of their overall response to complex public problems.

Author contributions*:* I designed this study in consultation with Laurie Goldsmith, Diane Finegood, Barb Riley, Cameron Willis, and Julie Greene. I conducted data collection and analysis and prepared the manuscript. Laurie Goldsmith participated in data analysis and drafting the manuscript. Diane Finegood also helped to draft the manuscript. My overall contribution to this manuscript was 70%, while my co-authors contributed the remaining 30%.

Chapter 4 is currently under review by *BMC Health Research Policy and Systems*.

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Chapter 2.

Systems science and obesity policy: a novel framework for analyzing and rethinking population-level planning

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2.1. Introduction

Obesity is widely recognized as a complex problem emerging from a system composed of many diverse, interacting variables (1–3). Several factors make the obesity system difficult to shift, including but not limited to: the presence of feedback loops and delays; an abundance of nonlinear, overlapping interdependencies; and the heterogeneity of individuals and organizations (1,4). Policymakers and planners have responded to the obesity epidemic by producing a large number of frameworks, strategies and action plans. Although past efforts have been criticized for emphasizing individual lifestyle change as the solution (5,6), recent efforts have embraced socio-ecological models of intervention, emphasizing the obesogenic environment and its impact on individual weight gain (3,7). The many options available to policymakers have the potential to result in what Lang and Rayner (6 p166) term a “policy cacophony” of noise drowning out effort.

Efforts to shift the systems that support the emergence of chronic disease and obesity are starting to benefit from a focused effort to apply systems science (8) as has been done with other pressing public health issues such as tobacco (9). Obesity, tied up with difficult ideological and political questions regarding responsibility and stigma (10–13) is a particularly wicked social problem for which reductionist science may be less helpful. Systems science can complement socio-ecological models of health promotion by examining not just the causes of obesity, but also interactions across its contributing subsystems (14). The UK Government’s Foresight program contributed to the perception

of obesity as a complex problem with the development of an obesity system map highlighting the diversity of factors involved in subsystems such as food production and consumption, individual physical activity and the physical activity environment, social and individual psychology, and physiology (4). The heuristic value of the Foresight map in demonstrating the complexity of obesity and the interdependencies between the system's variables is an example of a systems science tool that may help to advance the conversation about what actions need to be taken.

Although the Foresight map helps to focus dialogue on the complex nature of obesity, it does not immediately lead to discussion of solutions appropriate for this complex problem. We recently developed a systems science framework that may be a useful and accessible means of operationalizing systems thinking towards solutions. The Intervention Level Framework (ILF) was adapted from Donella Meadows' list of 12 "places to intervene" in complex systems (15). Meadows, a pioneering environmental scientist, spent decades analyzing the complexities of economic growth and environmental sustainability, wherein she grew frustrated with the unintended consequences that resulted when simple solutions were applied to complex problems. We collapsed the original twelve points of intervention into five more mutually exclusive levels that retain all of the original ideas, but allow for the sorting of content in a reproducible fashion. These levels account for system operation at the levels of paradigm, goals, system structure, feedback and delays, and structural elements. To date the ILF has been used in framework analyses of content concerning actions to improve food systems, wherein it was useful in elucidating points of conflict and convergence in making them more healthy, green, fair, and affordable (16).

In this article, we explore the application of the ILF to the obesity system by analyzing recent strategies and reports aimed at influencing policy and planning. Our interest was in developing a deeper, more integrated understanding of how best to act in addressing the complex problem of obesity. Using a systems lens we sought to advance our understanding of the various system levels and the specific interventions required to support large-scale change. We also seek to further the application of systems-based frameworks in the analysis of complex health problems in a manner accessible to public health practitioners and policymakers lacking expertise in systems science methodologies.

2.2. Methods

We located obesity strategies and policy documents developed by and for North American governments through online searches and recommendations from experts. We also searched academic repositories for documents containing population-level recommendations for obesity prevention and control. Rather than producing an exhaustive analysis of obesity strategies, our aim was to explore the utility of the ILF by identifying a rich set of recommendations garnered for a variety of purposes from decision makers working in different environmental contexts. Therefore, we selected twelve documents for analysis: 9 strategies or reports written by or for governments or health authorities in the United States and Canada (17–25); 1 Cochrane review of interventions to prevent childhood obesity (26); and two reports produced by the Institute of Medicine (IOM) (14,27). We prioritized documents aimed at the national level for the US and Canada, and provincial-level documents from Canada only. We also prioritized comprehensive strategies that presented novel frameworks or approaches to obesity (see for example, the PHSA document in our sub-analysis). All documents were published between 2004 and 2013, and 7 focus on childhood obesity.

We used two sets of codes to evaluate elements of complex systems design within the scope of each document. We based the first set of codes on variables listed in the Foresight Obesity Systems map, with new codes added to account for variables not described in the map but common to obesity strategies. The final taxonomy included 30 variables organized around 4 sub-systems: social and individual psychology; food production and consumption; physiology and clinical care; and physical activity. Where appropriate, data could be assigned more than 1 code, so total percentages could be more than 100%. We coded recommendations falling outside these predetermined categories using thematic descriptions driven by the data. We generated the second set of codes using the 5-level ILF (Table 2.1). Two researchers coded the recommendations, and discussed differences until consensus was reached. A total of 703 items were included in the final analysis once recommendations deemed uncodable (n=45) were removed, usually due to unfamiliar name and resource references.

Table 2.1. Intervention Level Framework

Level	Description
Paradigm	System's deepest held beliefs. Source of system's goals, rules and structures. Difficult to intervene at this level but can be very effective.
Goals	Targets that conform to the system's paradigm and need to be achieved for paradigm to shift. Actions at this level can change aim of the system.
System structure	Interconnections between system elements and sub-systems. Actions at this level will shift the system structure by changing system linkages or incorporating novel elements.
Feedback & delays	Allows the system to regulate itself by providing information about the outcome of different actions back to the source of the actions. Actions at this level can create new feedback or increase gain around existing loops.
Structural elements	Subsystems, actors and physical elements of the system. Easiest level at which to intervene. Many actions at this level are usually required to create system-wide change.

We conducted our analysis in three stages. In the first phase, we assessed quantitative distributions by ILF and Foresight topic to gain a broad overview of the data. In the second phase, we conducted a deeper examination of the data by ILF level, adapting the early-stage methods of framework synthesis (28) to summarize and identify the type of recommendations that make up the various levels of system function. In this stage, we continuously incorporated data into a matrix based on our a priori frameworks. We summarized homogenous content based on categories of intervention type that were identified inductively from the data, with the aim of capturing a broad picture of the types of interventions and content that made up each level of system function. For the third stage, we selected 3 documents from our data set and conducted an inter-document comparison such that we could compare and contrast recommendations from all 3 documents according to ILF level (Table 2.2). *Solving the Problem of Childhood Obesity within a Generation* (24) (hereinafter referred to as the White House strategy), produced by the White House Task Force on Childhood Obesity in 2010, was meant to inform the actions needed to fulfill this governmental mandate. *Accelerating Progress in Obesity Prevention* (14) (hereinafter referred to as the IOM report) is a report produced by the IOM in 2012 and intended to inform policymakers on how best to proceed with obesity

prevention from a systems-based perspective. The third document is a technical report produced in 2013 by the Provincial Health Services Authority (PHSA) in British Columbia, Canada. *From Weight to Well-Being* (18) (hereinafter referred to as the PHSA report) is intended to act as "a discussion paper on the inter-relationships among obesity, overweight, weight bias and mental well-being." We selected these 3 documents for their variation in mandates and approach; respectively, they represent a national government strategy, a report from an independent non-profit organization aimed at influencing policy, and a philosophical outlier in current thinking about obesity prevention.

2.3. Results

Figure 2.1. Relative Distribution of Recommendations by Foresight Topic

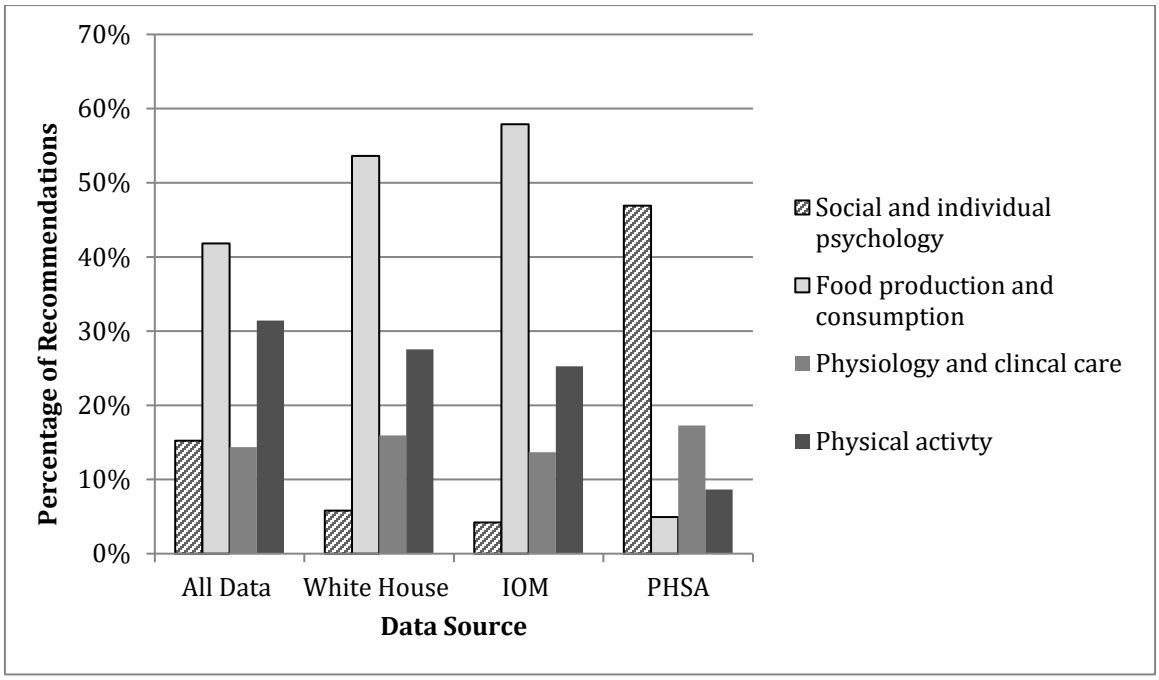

Figure 2.1 presents relative distribution of recommendations coded by Foresight topic for data from all 12 documents coded, and for each of the 3 documents selected for more in-depth analysis. Quantitative distribution of coding by topic category demonstrates that the majority of focus in the reports was on changing the key determinants of energy imbalance: improving diets (42%; n=294) and increasing physical activity (31%; n=221). In the food production and consumption category, mentions of changing individual behaviors through interventions such as disincentives

and incentives in the food environment and health education were most frequent (n=117), followed by measures related to improving food access in underserved communities (n=44). Recommendations also addressed marketing practices targeting children (n=19), nutritional labeling on food products (n=18) and improving the nutritional quality of processed foods (n=15). Physical activity recommendations included mentions of strategies to increase population-level activity (including building social supports and conducting social marketing campaigns; n=96), changes to improve the built environment (n=44), and increasing access to opportunities for activity through the opening of facilities and parks (n=33). Schools were also mentioned as a focal point for increasing physical activity through daily activity or improved physical education (n=23).

Recommendations that mentioned aspects of social and individual psychology made up 15% (n=107) of the data set. The majority of these addressed weight bias, bullying, and disordered eating. Physiology and clinical care recommendations made up 14% (n=101) of the data set. These most commonly addressed breastfeeding and prenatal care for mothers (emphasizing healthy weights for mother and baby; n=45) and healthcare services (n=42). Of the recommendations, 21% (n=149) mentioned whole system outcomes such as obesity rates or the measurement of physical activity or dietary activities as an indicator of system function. The IOM report and White House strategy had a higher than average focus on food production and consumption, whereas the PHSA report's focus on this area was lower than average. The PHSA report also had a disproportionate emphasis on individual and social psychology, reflecting the document's focus on well-being and mental health in relation to obesity.

Figure 2.2. Relative Distribution of Policy Recommendations by Intervention Level Framework

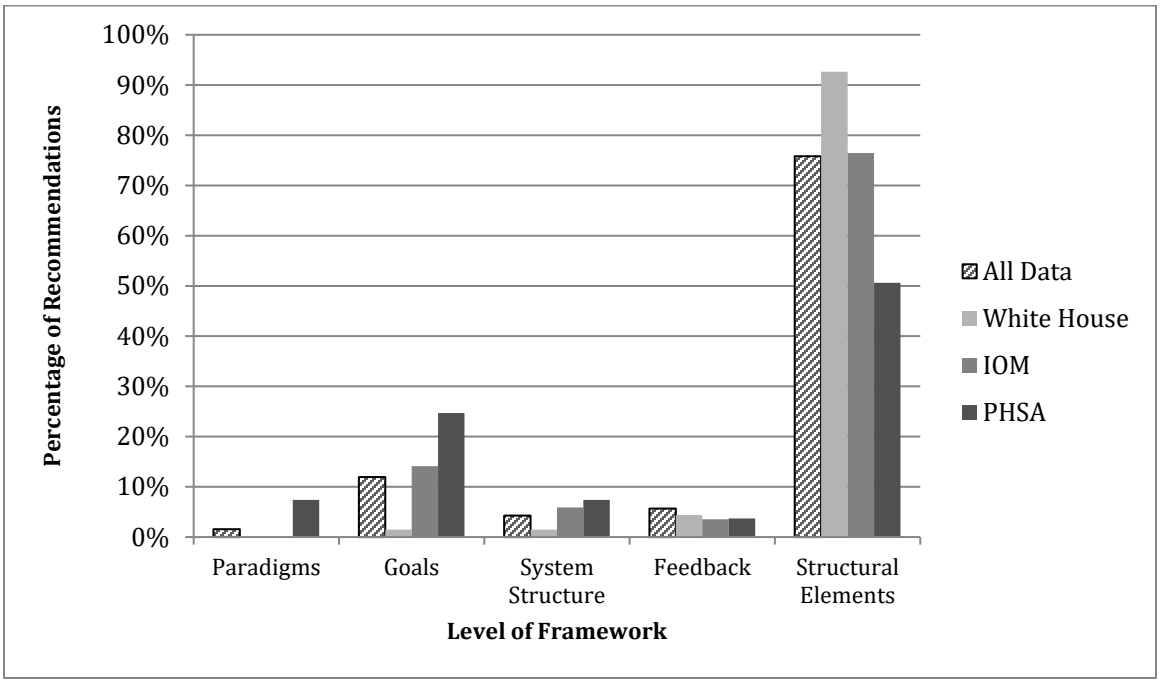

Figure 2.2 displays data from all 12 documents coded for ILF level compared with each of the 3 documents in our sub-analysis. Recommendations coded at the level of structural elements were the most common (76%, n=533). Examples of such interventions include health promotion and education programs, financial incentives or disincentives to change the behavior of individuals or institutions, attempts to change social norms through social marketing campaigns, and physical changes to environments to encourage physical activity and healthier eating.

We coded 12% (n=84) of recommendations as goals, which identify either measurable targets, such as rates of obesity or other indicators of healthy lifestyles, or aims for improving some aspect of system function, such as the achievement of walkable communities or stronger social relationships with regard to health. We coded 4 % (n=30) of recommendations as system structure changes and 6% (n=40) as feedback. Activities coded at system structure included efforts to build collaborations across sub-systems, thereby forging connections between new parties and expanding the boundaries of sub-systems. The most common types of recommendations coded as feedback were calls to evaluate programs or services or conduct surveillance of obesity rates or individual body mass index.

We coded only 2% (n=11) of recommendations as paradigms. The relative lack of recommendations at the level of paradigm is partly attributable to our data extraction process, in that including only “demarcated recommendations” may have excluded some statements in the bodies of the documents that would otherwise be coded as such. From those paradigms that were coded within recommendations, we found that they represented three general foci for addressing obesity: a) an equity lens emphasizing the social determinants of health (29); b) a socioecological approach, wherein it is believed that individual choices can be influenced by changes to the external environment (3,30); c) and the concept of flourishing, or moving beyond obesity as a focus and toward overall health and the active promotion of mental well-being (18).

Figure 2.2 also highlights differences in ILF distribution among the 3 documents selected for closer analysis. The White House strategy had a higher percentage of structural elements and a lower percentage of goals and system structure than the general average. Distribution of the IOM report contents was more in line with the collected average. The PHSA report appeared to be more goal and paradigm oriented than the other documents and the collected average. To examine how the recommendations in each document may contribute to the overarching complexity design and approach of each strategy, we synthesized and summarized the contents in an ILF framework. A selected sample of this analysis is presented in Table 2.2.

Table 2.2. Inter-document Comparison of Select Data by Intervention Level Framework

	White House (WH)	Institute of Medicine (IOM)	Provincial Health Services Authority (PHSA)	*Implications for Intervention and Policy Design*
Paradigms (deepest held beliefs)	*None Stated*	Society of healthy children, healthy families, and healthy communities in which all people realize their full potential and develop the competencies required to interact successfully with their surrounding environments*	Do no harm Adopt a positive and holistic view of health Focus on enhancing mental and physical well-being, not on weight	*May be explicitly stated (PHSA, IOM) or inferred from stated goals or other system activities.* *Represent the desired system's underlying beliefs regarding health and its orientation toward solutions (see IOM, for example).* *Warrants consideration as it has potential to guide day-to-day thinking, behaviours and norms at lower levels of system activity.*

	White House (WH)	**Institute of Medicine (IOM)**	**Provincial Health Services Authority (PHSA)**	***Implications for Intervention and Policy Design***
Goals (the targets)	Look for opportunities to base policies and practices on current scientific evidence Achieve a childhood obesity rate of 5% by 2030*	Large-scale transformative approaches focused on multilevel environmental and policy changes within interconnected systems to reduce the threat of obesity and sustain an enduring impact* Create food and beverage environments that ensure the healthy choice is the easy choice Make physical activity an integral and routine part of everyday life Transform messaging about healthy eating and physical activity	Create environment of belonging Encourage social awareness and responsibility Help youth to find meaning in helping others so focus is not only self but also enhancing lives of others	*Outcome goals such as targets for obesity rates (WH) appeal to leadership but should be considered in light of system influence, potential unintended consequences, and subjectivity to system feedback and delays.* *Process goals that set targets for system behavior (IOM, PHSA) push thinking about shifting norms and culture to produce healthier outcomes. They may also emphasize relationships and information flow, which can in turn be supported by action at the structural level. Actions designed to support relationship goals will differ significantly from actions intended to primarily support population weight reduction.*

	White House (WH)	Institute of Medicine (IOM)	Provincial Health Services Authority (PHSA)	*Implications for Intervention and Policy Design*
Structure (across the system)	Incorporate more fresh food in school meals by connecting local growers to schools	Health care leaders should advocate for strategies that improve physical activity and nutrition resources for patients and communities Cross-sectoral collaborations to develop private funding for healthy food retailing in underserved areas	Share promising practices on whole-of-government and inter-sectoral approaches Include fields like anthropology, sociology, nursing, community psychology, arts and culture, and urban design, to enable framing obesity as a complex socio-cultural issue rather than a biomedical one	*The relatively low number of activities coded as this level suggests opportunity for more engagement with cross-sectoral activity.* *Activities here emphasize information flow, knowledge transfer and relationship building (IOM, PHSA).* *They can also relate to shifting material conditions across the system, such as influencing supply and demand (WH).*

	White House (WH)	Institute of Medicine (IOM)	Provincial Health Services Authority (PHSA)	*Implications for Intervention and Policy Design*
Feedback & Delays (loop dynamics)	Evaluate sales taxes on less healthy, energy-dense foods Evaluate targeted subsidies on purchases of healthy food through nutrition assistance programs Pediatricians calculate children's BMI and provide information to parents about how to help their children achieve a healthy weight	Develop policy options for promoting increased domestic production of healthy, under consumed foods Evaluate evidence on the relationship between agriculture policies and the American diet	Create policies and reward systems that focus on life balance Fund and encourage health impact assessment within all government policies Collect, monitor, analyze and share health equity and population health indicators	*Closely linked to system goals.* *Can include traditional evaluation of policy and feedback in clinical settings (WH), or may reflect process-oriented goals regarding mental health and wellness (PHSA).* *Planners may attempt to affect feedback loops within the system (such as the IOM increasing healthy food production) with lower level activities built in to encourage positive feedback (by increasing healthy food consumption in the case of the IOM).* *Presents opportunities for innovation in evaluation design and use of indicators for monitoring, as in the case of the PHSA emphasis on health equity indicators.*

	White House (WH)	Institute of Medicine (IOM)	Provincial Health Services Authority (PHSA)	*Implications for Intervention and Policy Design*
Structural elements (subsystem specific) ***Note: Broad summaries due to high volume of content coded at this level***	Improve food and physical activity environments, especially in early childhood settings Improve access to healthy food in underserved communities and access to physical activity for populations with barriers Improve access to health services and training for professionals on prevention, treatment and management of overweight and obesity	Improve food and physical activity environments Conduct social marketing campaigns Engage public in discussion about environmental and policy changes Reduce consumption of sugar-sweetened beverages Support translation of scientific evidence into best practice re. physical activity interventions	Conduct participatory research and policy development, engaging people with weight-related issues Act to reduce weight bias in the population and increase body size diversity acceptance Use wholistic approaches to improving diet and increasing physical activity, emphasizing pleasure and health as end goals rather than BMI Encourage clinical treatment without a focus on weight and address stigmatizing practices by professionals	*Activities at this level are influenced by regional and local population needs, and the evidence and/or informants consulted. Targeting sugar-sweetened beverage reduction (IOM), for example, is not universal in obesity strategies.* *Structural elements can be assessed in light of higher-level activities to identify how they might support or be supported by them.* *ILF analysis at this level aids in assessment of whether all subsystems are given appropriate attention with regard to intervention efforts, or are in alignment with stated goals and paradigms.*

Note: Contents may be paraphrased from original documents
*Indicates pulled from body of text rather than formal list of recommendations

2.4. Discussion

Our analysis suggests that using the ILF to sort and examine recommendations by system level is useful in surfacing how the complexity of obesity is addressed within policy documents. The White House strategy, for example, made no mention of obesity's complexity. Its recommendations were guided not by a paradigm but by the goal of "solving childhood obesity within a generation" (24 p.9) and its recommendations were skewed toward the lowest level of system function. The IOM report differed in that it was explicitly grounded in a systems perspective. The PHSA report also recognized the complexity of obesity as a multi-faceted issue resulting from non-linear relationships and that commonly proposed solutions are capable of creating unintended consequences. The stronger orientation of the latter two documents toward planning at the level of goals and system structure may reflect a greater orientation toward a whole systems approach to obesity.

The majority of recommendations for all documents are coded at the level of system elements, the level of system function where the majority of concrete work in dealing with complex problems takes place. Taken together in a coordinated effort, these activities have the potential to generate seismic shifts in systems function and thinking (15). The activities at this level are also most likely to directly impact individuals. In considering complex problems from a systems science perspective, it is sometimes necessary to be reminded that individuals matter (31). This is particularly relevant when dealing with obesity, a "social problem" made physically manifest in individuals who regularly experience stigmatization in educational, workplace, health care and other settings (32,33). Given this, one of the more interesting findings of our analysis was the relative lack of attention paid to the issue of weight-related stigma and bias in our data set overall. The higher than average emphasis on this aspect of obesity in the PHSA document is in part an attempt to shift the culture of thinking about weight and obesity. More traditional attempts to shift this culture include social marketing to change social norms regarding diet and exercise, a strategy that some argue is fruitless against the massive marketing power of industry (5). Employing systems science thinking in the evaluation of lower-level interventions may help determine which combination of "simple solutions" has the potential to contribute to broader system change (34). The ILF situates these activities in relation to the paradigms and goals driving decision-making,

while also pushing us to think about which feedback mechanisms and connections across the system's structural elements might support their overall success.

Identifying a system's paradigm – an important, yet difficult to shift, influencer of system behavior – presents a natural starting point for integrating a systems science lens into planning. Paradigms are inherently tied up with social values and cultural meaning, which are hotly contested topics with regard to obesity (11,35). The metaphors that stem from paradigms are also powerful predictors of policy support (36) and are closely tied to the framing of responsibility that occurs in public discourse regarding obesity (37). The documents presented here represent a continuum of approaches to obesity as a social issue (Table 2.2). These range from a socio-ecological model emphasizing activities at the level of structural elements (White House); to a systems-based approach more firmly grounded in shifting the higher system drivers of obesity at a social level (IOM); to a paradigm-shifting lens wherein our societal response to obesity is seen as potentially more problematic than the condition itself (PHSA). Planning interventions using the ILF may encourage policymakers to engage with the complexity of the current debate regarding the paradigms guiding obesity as a public health and social issue.

Thinking seriously about paradigms can also help planners address what Meadows refers to as common system traps, such as "seeking the wrong goals" (15 p138). Activities at the goal-setting level have considerable power to shift system dynamics by legislating or mandating which variables will be monitored for reporting. The process of framing the goals dictates the type of data collection that interventions will be designed to support. Therefore, success and failure in achieving goals is highly interdependent with feedback mechanisms and delays. Situating system activities within the ILF may help decision makers with design, evaluation and knowledge transfer planning in light of these interdependencies. For example, evidence suggests that outcome goals (such as targets for obesity reduction rates) may fall into the system trap of being the wrong goals. Not only does this particular goal fail to account for the sensitivity of system behavior to natural feedback loops, but it can also produce unintended consequences. A recent survey of public health interventions aimed at influencing energy balance in individuals found that the models underpinning efforts were simple and did not account for the feedback mechanisms identified in biochemistry and physiology (38). As such, many interventions were deemed failures in spite of

potential success in improving health outcomes overall. Setting unrealistic goals regarding weight loss targets can poise both individuals and populations for failure, whereas process goals such as those set forth in the IOM report (i.e. “Make physical activity an integral and routine part of everyday life” [14 p10]) prompt a deeper examination of environments and opportunities to leverage change within them.

A stronger understanding of the inter-relationships between feedback and goals, informed by systems science, may assist policymakers in formulating goals that speak to system processes, and the concrete actions that need to be taken to make strategic shifts (1). Feedback mechanisms that are currently built into strategies often emphasize evaluation of recommended interventions, such as taxes and subsidies aimed at improving dietary habits (White House strategy*)*. The PHSA report ties feedback to advocacy for a “health in all policies” approach and to broader indicators of health and well-being, such as equity. This approach aligns with the document’s goals and paradigms, and reflects a larger paradigm shift taking place as a growing number of policy documents address the social determinants of health (39). The IOM report presents an example of moving beyond thinking of feedback at the level of monitoring system function (i.e. the success or failure of interventions or intended outcomes), and toward building feedback *into* a sub-system itself by seeking to effect the supply and demand relationship of healthy food production. Sterman (40) notes that a failure to focus on feedback in policy design has critical consequences, prompting us to reconsider the role of feedback and delays in future planning. This approach may help drive the use of novel approaches in assessing best practice and evaluation design. For example, the field of developmental evaluation calls for the incorporation of systems thinking for optimal alignment between evaluation practices and the tenants of complex science (41).

Activities aimed at the level of system structure have the potential to shift both the physical components of a system and the flow of information among its players. The White House strategy recommendation that schools, a major consumer of food products, be connected directly to local growers links the food production and consumption sub-systems, and has the potential to shift the laws of supply and demand that govern the food system. Cross-sector collaboration across sub-systems also has the potential to network like-minded social movements and synergistically increase their impact, (42) while potentially addressing the system trap of policy resistance, which Meadows

suggests is partly attributable to the competing interests of system actors. The IOM reimagined and extended the role of players in the obesity system as health care professionals acting as community advocates. The PHSA similarly extended the boundaries of sub-system activity by seeking to broaden the research base informing obesity policy in order to steer it away from a biomedical paradigm. Theorists have argued that changes in the obesity system will ultimately be grounded in shifting social norms and cultures (5,43); improving the dissemination of knowledge and innovation throughout system networks through activities targeting the system structure level may contribute to this shift.

2.5. Limitations

As noted previously, our data set was not comprehensive. Additionally, there were some limitations to our inclusion of demarcated recommendations, particularly when it came to locating goals and paradigm statements. These limitations were potentially mitigated by efforts to consider these challenges while conducting the more in-depth portion of the analysis, which may result in qualitative results being more impacted by these approaches than the quantitative results.

2.6. Conclusions

Complex public health problems such as obesity indicate the need for systems science study designs for research and training in public health (8,44). We have developed the ILF as an analytic and a heuristic tool that may be helpful in planning for interventions aimed at complex social and public health problems. This study demonstrates the value of a systems perspective and how use of a tool like the ILF can provide a deeper insight into changes required at multiple levels of the system. The term “holistic approaches” usually makes reference to either the inclusion of multiple sectors or strategies that include actions that range from individual to population levels. By applying the ILF to solutions design, we can optimize strategies to include interventions that range from targeting specific groups of people and a specific behavior, to those impacting the deeply held beliefs that underlie the actions of actors throughout the system.

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Chapter 3.

Cross-sector partnerships and public health: challenges and opportunities for addressing obesity and non-communicable diseases through engagement with the private sector

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3.1. Introduction

Public health is, at its heart, a cooperative venture. Whether called partnership, collaboration, or cross-sectoral engagement, working with a diverse range of actors across multiple settings is considered core practice and a logical means to address the many determinants of health that lie outside the reach of public health systems (1,2). These relationships take many forms, including public–private partnerships, nonprofit–private partnerships, and public–nonprofit partnerships. We refer to them in this article under the broader umbrella of cross-sector partnerships (CSPs) while maintaining clear distinctions between the public, nonprofit, and private sectors.

A push toward CSPs has emerged in response to the epidemics of obesity and non-communicable diseases (NCDs). Obesity - a risk factor for NCDs such as heart disease, stroke, diabetes and some cancers - has been on the rise, affecting approximately 35% of adults globally as of 2008 (3). The incidence and expected growth of NCDs has been identified as a global health crisis, responsible for an estimated 35 million deaths in 2005, with total deaths estimated to have increased by 17% in the years since (4). The urgency of this situation has compelled many public sector and non-profit organizations (NPOs) to explore all avenues of response, including CSPs involving the private sector.

Past experience with the tobacco industry and the marketing of infant formula has made public health practitioners particularly wary of the private sector. More recently, CSPs including the private sector have become accepted practice in areas such as vaccine development and distribution to prevent and manage infectious diseases in low- and middle-income countries (LMICs) (5). Correspondingly, the World Health Organization (WHO) has shifted its stance toward partnerships with the private sector: Once wary, it now embraces them where they are deemed appropriate (6). Whether CSPs with the private sector are appropriate for NCDs and obesity prevention remains a topic of considerable debate.

Critics of partnerships with the private sector fear a conflict of interest (COI), a weakening of the roles and responsibilities of the public sector, and an undermining of public health's efforts to improve population health. Proponents suggest that public–private partnerships are an important means of fostering collective action and providing potentially life-saving interventions. CSPs including the private sector in public health practice require special consideration and the application of operational tools and frameworks to ensure their effective and ethical management and oversight. In this article, we examine the role of CSPs in public health with a specific focus on their application to obesity and NCD prevention in high-income countries (HICs). We review the basics of CSPs for public health, including their recent history, definitions, and organizational roles and responsibilities, as well as their risks, benefits, opportunities, and criteria for success. Using examples, we consider the range of CSPs enacted for obesity and NCD prevention in HICs and the concerns they raise for public health. Lastly, we turn to core issues including trust, COI, and monitoring and evaluation to identify measures for improving CSPs in the future.

3.2. Cross-sector partnerships in public health

3.2.1. Definitions

The commonly used term public–private partnership has been employed ambiguously across numerous research, practice, and policy domains. "Public" has been used to refer to direct government involvement, such as in the use of public–private partnerships or P3s in reference to large-scale public infrastructure projects. In some cases, "public" has been used to refer to all government- plus taxpayer-funded

nongovernmental organizations (NGOs); in other instances, it has been applied indiscriminately to all nonprofit organizations regardless of whether they are publicly or privately funded. To minimize this ambiguity we use “cross-sector partnership” to refer to any combination of public, nonprofit (both publicly and privately funded), and private-sector (for-profit) relationships.

The term partnership has also been employed ambiguously, having been used interchangeably with a myriad of other terms including but not limited to collaboration, alliance, coalition, network, interorganizational relationship, joint advocacy campaign, and taskforce (7-10). Austin (7) described a “collaboration continuum,” which situates relationships along a spectrum ranging from philanthropic, in which a charitable donor and recipient exchange resources focused on specific activities, to integrative, in which “the partners’ missions, people, and activities begin to merge into more collective action and organizational integration” (p71).

Hawkes and Buse (11) suggest that varied and inconsistent use of the term partnership “muddles the discourse” about governance of public–private interactions, with serious implications for civil society. They note that many activities defined as public–private partnerships consist of philanthropic exchange in the form of sponsorships or grants transferred from private sectors to public sectors. Although exceptions can be seen wherein public funding is provided to private-sector entities, most exchanges of financial or in-kind resources between public health and the private sector occur when public and nonprofit sectors seek out private-sector resources as a means to achieve their own ends (11). As such the authors criticize public health’s disingenuous description of these arrangements as “partnerships,” specifically when they do not involve shared decision-making powers around project agenda setting, goals, and strategies. Their preferred language for relationships that do not involve shared decision-making is public–private *interaction* or *engagement*.

The continuum of relationships between the private sector and public sector or NPOs can be further articulated with a systems science framework. Table 3.1 describes the continuum from interactions and engagement to true partnership at different levels of a complex system, using categories derived from our systems analysis tool, the Intervention Level Framework (ILF) (12,13). The relationship continuum is often expressed in the literature in terms of the *structure* of relationships, i.e. the nature of the

exchanges that occur between sectors working in different parts of the larger system contributing to NCDs and obesity. In Table 3.1 and the following sections we consider how the continuum can be understood in terms of other aspects of a system such as the goals of the relationship and the paradigm under which the relationship operates.

Table 3.1. Continuum of Relationships Across Levels in a System

System level	Description	
	Interactions/Engagements	Partnerships
Paradigm	• Philanthropic to transactional • Simple or basic trust (sometimes cordial hypocrisy).	• Transactional to integrative • Authentic trust
Goals	• Peripheral to mission • Minor strategic value • Knowledge exchange • Co-branding, cause related marketing	• Central to mission • Major strategic value • Organizational influence • Policy or program change
Structure (including loops & subsystems)	• Low level of engagement, infrequent interaction • Small, often one-way exchange of resources • Narrow scope of activities • Organizational independence • Simple to manage	• High level of engagement, intense interaction • Big, usually two-way exchange of resources • Broad scope of activities • Shared governance / interdependence • Complex to manage

3.2.2. Paradigms

The paradigm is the mind-set of the system, the level from which the system's goals, structure, rules, delays, and parameters arise (14). In public health, the paradigm has shifted in recent years as it relates to CSPs with the private sector. Public health's experience with the tobacco industry beginning in the 1960s has informed the current discourse about CSPs. With respect to obesity and NCD prevention, public health advocates have likened "big food" to "big tobacco," suggesting CSPs with food industry partners are inappropriate (15–17). In other areas such as vaccine and drug development and distribution, CSPs involving the private sector ("big pharma") have become commonplace (18–20).

The growing acceptance of CSPs with the private sector can be traced back to the 1980s movement to privatize public-sector functions in the name of increased efficiency and cost-savings, which represented a retreat from hard-line support for

privatization during the 1990s (18,21). These trends fostered a reimagining of the roles and responsibilities of the public, nonprofit, and private sectors, the former of which having lost some of their authority over the notion of the public good and the private sector having become a more accepted partner in the management of large public infrastructure and social functions (22). As such, the public sector's responsibility for maintaining systems that promote health and welfare as originally imagined in the UN Declaration of Human Rights has been diluted, which has raised concerns about the private sector's encroachment into policy setting and governance (18). Alternately, the shift can be understood as a natural extension of popular management reforms that emphasize holist approaches to the complex problems arising in the age of globalization (21).

Indeed, the complexity of publicly managed social problems has been a key driver toward acceptance of CSPs as a solution (22,23). Sometimes called "wicked" or "intractable," challenges such as obesity and NCD prevention are recognized as exhibiting the hallmarks of complexity in that they involve a wide diversity of interdependent actors and institutions whose actions contribute to a larger, dynamic system, thereby making it difficult to pinpoint and address causality (24). We have argued that such systems require a shift toward solutions that are appropriate for complex problems. These solutions tend to be distributed and comprehensive and to require building trust in cross-sector collaboration and partnership. They also benefit from measurement systems that enable continuous adaptation and improvement on functional goals (24). Carefully developed CSPs can support solutions to complex public health problems, but they must be developed and managed with an understanding of each sector's goals and responsibilities.

3.2.3. Goals

A frequently cited rationale for partnering is the ability to accomplish goals together that each party could not achieve on its own. In terms of project management, clear articulation of goals is essential for achieving success and establishing accountability. Setting goals (or objectives) for individual health promotion programs or social media campaigns may prove a relatively straightforward process. However, goal alignment at the broader sectoral level poses significant challenges that should be considered when forming CSPs. Hawkes and Buse suggest that partnerships should be

considered in the context of interests rather than goals or objectives (11). In this view, the pre-existing mandates and responsibilities of each sector are an important consideration for partnering.

Private-sector participants are motivated to partner because of numerous variables, including the interests of their leadership, the nature of their business, and their organizational approach to social and ethical issues. Corporate social responsibility (CSR), which extends corporate interests into social and ethical concerns, has expanded significantly (15) and driven the private sector to seek out partnerships on a range of social issues, contributing to what Austin (22) calls an “alliance marketplace.” These relationships may be driven by personal interests or connections and/or may exist as part of broader corporate strategic endeavors to curry positive public goodwill and protect their core business from restrictive legislation, as was the case with tobacco (15). Industry is also motivated to partner with social causes to make itself more attractive to potential employees, build culture among staff, and generate business through goodwill and extending its contacts with external linkages (22). In the case of contentious interactions, such as that between the health sector and food and beverage companies, partnerships should be considered in the context of the corporation’s core legal obligation, which is to maximize profits for its shareholders.

The public sector has a mandate to service the public interest, along with special rights and powers that can be applied toward addressing complex social problems (25). The public and publicly funded nonprofit sectors are motivated to partner with the private sector to acquire resources, increase the scale and scope of their efforts through increased visibility, and increase their capacity to address complex problems (22). The need for new funding and capacities in a time of scarce resources and public austerity measures can be a strong driver to partner in the pursuit of program objectives. As defined by WHO, public health is mandated to implement measures that promote health and prevent and control disease among the population as a whole (26). These efforts include developing public policy to address health priorities and ensuring access to appropriate and cost effective health care and health promotion. Those working in public health may offer expertise in the design and implementation of health promotion and education programs to private-sector partners (27). Some take a broader perspective on the role of public health, prioritizing advocacy for a health-in-all-policies approach and addressing the fundamental societal causes of disease (2,28). From this perspective,

public health should look beyond whether a partnership will help achieve its objectives and take into consideration whether the interests of activities of potential partners clash with its broader vision of a healthier society.

Civil society representatives, who include NPOs or NGOs, are also active participants in CSPs for health. Working toward social issues independent of the state and market, NPOs and NGOs are often perceived as having special virtues and are therefore attractive partners for businesses seeking goodwill by association (7). The growth in privately funded nonprofits, ranging from the Gates Foundation to the PepsiCo Foundation, that participate in CSPs further complicates the assessment of interests. Linkages between foundations and the private sector are well documented, and decision making regarding priorities for investment in health is concentrated in a powerful few who largely guide the global health agenda (29). CSPs between members of the scientific community and the private sector raise similar concerns regarding potential COI. Marks and Thompson (30) suggest that interactions with the food industry have not been subject to the same level of scrutiny as those between physicians and the pharmaceutical industry and note the potential for bias in food industry–funded research (28). Industry has also been charged with buying legitimacy by recruiting former leaders from the health sector and partnering with prominent medical organizations.

Given this range of interests and the potential for COI, CSPs pose a challenge for public health professionals beyond merely identifying desired program objectives. In making the distinction between interests and objectives, Hawkes and Buse (11) argue that the interests of each party are unlikely to be equally served through partnership; rather, those of the more powerful partner will generally be favored. Although this reality need not preclude public health's partnering with industry altogether, the authors ask that public health be honest about it. Roberts et al. (31) similarly suggest that the achievement of goals is not a sufficient basis for partnering with industry because public health has an obligation to pursue ethical goals and not just partnership for its own sake. Hawkes and Buse propose three questions that policy makers should ask themselves before engaging with the food industry to achieve its own independently set objectives. Paraphrased here, they are: first, will engagement achieve the objective faster and more effectively; second, would the interests of both sides enhance or threaten the likelihood of achieving the objective or longer-term public health objectives; and, third, would a real partnership or looser form of interaction most effectively achieve the objective (11)?

3.2.4. Structures, loops and interdependencies

Although paradigms and goals guide system function, activities at the structural level of a complex system are where the system's dynamic behavior manifests through the interdependencies and feedback loops between sectors and actors (14). Power struggles are contested at this level, particularly by the public and private sectors—the former through its ability to legislate and regulate system behavior and the latter through its financial power and influence over the consumer marketplace. Many of the elements of the collaboration continuum described by Austin (7) are structural in nature, including the level of engagement or interaction, the scope of activities, and the managerial complexity. At one end of the continuum, interactions between partners are infrequent with low levels of engagement, resource exchange is relatively small and often one-way, and activities cover a narrow scope. These engagements may be early-stage CSPs and are simple to manage; each organization maintains its independence (Table 3.1). At the partnership end of the continuum, there is usually a higher level of engagement, intense interaction, and large two-way exchanges of resources with a broader scope of activities. The structures of true partnerships recognize interdependencies, include shared governance structures, and are often complex to manage. The challenges, risks, benefits, and critical success factors for all kinds of partnering have been well documented and are largely applicable to public health CSPs with the private sector. These are summarized in Table 3.2. The further along the continuum toward partnership, the more important it becomes to consider criteria for success, particularly in the early stages of the relationship.

Table 3.2. Challenges, Benefits, Risks and Criteria for Partnership Success

Challenges	• Differences in inter-organizational cultures and language • Lack of appreciation for each other's roles • Establishing agreement on appropriate means of measuring accountability and other performance measures
Risks	• Dilution of organization's goals or cultures, or loss of autonomy • For business, becoming mired in public sector bureaucracy • Unequal power relations which can be destructive for weaker members • Conflict of interest • Confused accountability For the public or nonprofit sector, negative reputation impact
Benefits	• Access to resources, expertise and knowledge transfer • Improved service provision • Bringing divergent perspectives to social problems • Merging of goals and interests through the adoption of cultural norms of other sector
Criteria for Success	• Alignment of strategy, mission and values • Personal connections and relationships (leaders on either side) • Trust and mutual respect • Good governance practices (re representation, transparency and accountability) • Acknowledge and respect partners' divergent interests • Commitment of resources for carrying partnership out • Strong project management with clear expectations of expected outcomes and benefits, roles and responsibilities • Expectation management • Horizontal rather than vertical relationships with equal power • Built-in processes for review and evaluation

Note: table content summarized from multiple sources (7, 9, 18, 23, 25, 41, 63-66)

Because partnerships exist along a continuum and stakeholders desire flexibility for their real world applications, it is difficult to establish clear definitions and guidelines for partnership. Widdus (10) suggests that public–private partnerships should be viewed as social experiments and argues that there is "no formula for constructing them and it is unlikely that a universally applicable one will be found" (10, p718). Although all partners need to be flexible in implementing CSPs, this flexibility must be balanced with necessary protection against COI and other threats to the integrity of the public sphere. In the following section, we consider the particular challenges posed in this area related to partnering for obesity and NCD prevention and control.

3.3. Cross-sector partnerships in obesity and NCD prevention and control

3.3.1. Paradigms and goals

Much of what we know from previous experience with CSPs as applied to social and global health problems is generalizable to other issues. Some aspects, however, are necessarily context-dependent because CSPs are usually tailored to address specific diseases or conditions, and they operate in specific political and social environments relative to the determinants of those specific diseases or conditions. The frame by which we understand the causes of obesity and NCDs has clearly influenced perceptions of CSPs that address prevention and control.

Obesity and NCD causation are understood using two main competing paradigms. The first posits that individuals are largely responsible for decision making regarding their health behaviors and resultant health outcomes. Poor diets and physical inactivity are a focal point of intervention, although tobacco use continues to be part of the bigger picture. This frame of causation suggests that solutions can be found in reductionist models of behavior change. Under this paradigm, environmental interventions that support healthy decision making may also be considered, but the emphasis is on individuals as rational decision makers. The healthy lifestyle frame of causation emphasizes individual behavior change as the solution, an approach supported by some CSPs and articulated in many obesity strategies (13).

When the frame shifts more toward socioecological models of causation, the emphasis becomes the complex, interrelated causal factors that give rise to disease. This frame identifies macrolevel and microlevel determinants that range in their proximity to individuals and act across varying levels of social relationships, settings, and influences (32). The socioecological frame may also recognize the influence that social determinants of health have on unequally distributing poor health outcomes along geographic, economic, and ethnic lines. A socioecological approach to obesity and NCD prevention has been to coordinate and implement actions across a broad range of settings and levels, with an emphasis on policy measures intended to reverse-engineer the environment (33-35).

Researchers have argued that the presence of many factors and the interactions that occur among them have created toxic or obesogenic environments that frequently override individual willpower required for healthful decision making. Advocates for broader social and fiscal policy measures suggest they are a more efficient and cost-effective means of shifting social norms and reducing NCDs and obesity than are healthy lifestyle interventions that prove difficult to scale up and spread (29). However, whereas the population needs to reduce caloric intake, the food industry overproduces calories and motivates people to consume them, particularly its most processed, calorie-dense, and nutritionally poor products (36,37). Transnational food corporations have thus followed in tobacco's footsteps to combat proposed regulatory action that might affect their bottom line. CSPs are employed as part of big food's strategy to shift focus away from diet as a determinant of obesity and NCDs by emphasizing the physical activity and sedentary living side of the energy balance equation (38). The food and beverage industry also lobbies against regulatory measures through front groups such as the Center for Consumer Freedom, which frames calls for regulation as the actions of an interfering nanny state in their industry-funded advocacy for consumer rights (28,36,39).

The socioecological frame has also been employed to support the notion that the food and beverage industry, given their contributions to NCDs and obesity and influence over the population, should be brought to the table to discuss solutions. Advocates for CSPs suggest these partnerships provide a means by which public health can help the private sector design health promotion programs while also influencing private partners to pursue more health-conscious business models (27). In addition, CSPs acknowledge that the food industry has the knowledge and capacity to improve the nutritional profiles of its products. Some food companies have expressed support for regulations that level the playing field for businesses, such as across-the-board limits for salt or sugar levels in processed foods, to incentivize and accelerate product reformulation (40). In addition, voluntary action has been taken on issues such as marketing to children and removing calories from the food supply. Within a socioecological frame, these actions suggest a willingness to align interests with those of public health (41-43). In response, critics have highlighted the shortcomings of these initiatives and the smoke screen they create for efforts to shift social norms regarding unhealthy diets (44). They argue that the balance of benefits for CSPs will always be unequally skewed toward the private sector.

Food and beverage industry representatives have equated embargoes on partnership to a “demonization” of industry, the consequences of which are their complete exclusion from working toward positive outcomes. However, even the harshest critics of the food industry note that dialogue and engagement are acceptable with appropriate protections and boundaries in place. In this case, it is especially important that the distinction between engagement and partnership with the food and beverage industry be made explicitly clear.

3.3.2. Structures and risk management

Examples of CSPs involving the private sector help elucidate the various structures employed and their implications for risk management (see Table 3.3 for a select overview). At one end of the partnership continuum, cross-sector interactions or engagements to address obesity and NCD prevention have taken the form of platforms for discussion such as the Building Trust Initiative, where individuals from government, the private sector, non-profits and academia were brought together to discuss the challenges and opportunities for building authentic trust as a foundation for building CSPs (45). At this end of the spectrum are also transactional arrangements such as the provision of a grant by Coca-Cola to the American Academy of Family Physicians (AAFP) for the development of educational materials (46).

At the other end of the spectrum are large scale programs such as the EPODE International Network, which builds local capacity and partnerships in multiple communities and countries to address childhood obesity (47). EPODE founding partners include large transnational food and beverage companies. Another large scale joint venture is America on the Move (AOM), a non-profit foundation that seeks to improve Americans’ health and quality of life by encouraging a small changes approach to healthful eating and active lifestyles among individuals, families, communities and society (48). The AOM Board of Directors includes individuals from the public and private sector. Another example at the true partnership end of the continuum is illustrated by Shape Up Somerville, which employed a community-based participatory research methodology to develop and implement interventions to address local population needs. Power was shared between small business owners and experts in regard to priority-setting and project management (49).

CSPs built around social marketing and education include sponsorships, wherein private funding is provided for public awareness and educational programs designed by health organizations. Change4Life in the United Kingdom (50) and ParticipACTION in Canada (51) are both social marketing CSPs in which the government provided funding and created a structure for public–private partnerships. More unusual is the example of Canada on the Move, a program of population intervention research built on a product-marketing campaign in which more than one million pedometers were given away in boxes of Kellogg's Special K cereal (52).

The examples in Table 3.3 highlight the diverse range of cross-sector activities for obesity prevention and control and demonstrate that there is no singular model for working with the private sector; many interactions have mixed elements from opposite ends of the collaboration and partnership continuum. As Widdus (10) suggests, public-private partnerships are social experiments without a standard formula for their construction or implementation.

These examples also highlight variation in risk present across interactions depending on both the nature of the interaction and the actors involved. Shape Up Somerville presented a financial risk to local businesses, and Coca-Cola presented a risk to perceptions of the brand of the AAFP. Risk to the brand of the public sector was also real in the case of Canada on the Move because the federal government's health research funding agency's brand was printed on the back of a box of cereal. Although the particular brand of cereal was marketed as a healthy choice, critics argued that the company was an unsuitable partner because it also marketed many sugar-sweetened cereals to children.

The examples in Table 3.3 also point to the varied approaches to risk management adopted by participating actors. Some CSPs employ formally established institutional guidelines for partnering. Risk management has also been conducted less formally, depending on the potential for COI inherent in the engagement. To mitigate possible COI when working with the food and beverage industry, watchdogs suggest that health organizations partner with the private sector only when it does not have input into program content and is prevented from branding any program materials, in part to prevent marketing to children (36,53). EPODE is an example of putting this strategy into practice and may be viewed as successfully having navigated COI in its engagement

with industry. Observers, however, have advocated for a broader perspective on COI, positing that some engagements carry risks to the public good that cannot be mitigated through adequate governance or oversight. These include relationships that threaten the legitimacy of public institutions (such as the AAFP's acceptance of funding from Coca-Cola) and those that provide the private sector with the means to present themselves to policymakers as health-promoting organizations in their efforts to combat public health initiatives to regulate the food environment (54).

Table 3.3: Examples of Cross-Sectoral Engagements/Partnerships for NCD and Obesity Prevention

Title & Description	Structure	Rewards	Risks	Risk Management
American Academy of Family Physicians (AAFP) and Coca-Cola (46)				
Grant provided by Coca-Cola to develop consumer education material, including content about beverages and sweeteners	Sponsorship One-way exchange of resources Narrow scope of activity	Increased capacity to educate public via the FamilyDoctor.org website	Damage to public trust in AAFP and perceived influence on educational content "Health-washes" Coca-Cola as health-promoting corporation	Managed under regularly used AAFP internal and external COI standards All content controlled by AAFP, peer-reviewed and free from commercial endorsement
Change4Life (50)				
Social marketing arm of UK Gov obesity plan National partners asked to align activities and create campaigns to support behavior change	Large-scale TV ads, billboards and web platform encouraging healthy habits	Greater alignment of public and private sector messaging Expanding campaign reach Potential to influence national partners toward healthier practices	Perceived COI	Partnerships governed by Terms of Engagement Final approval of partner messaging and use of campaign logo
Canada on the Move (52)				
Canadian Institute of Health Research (CIHR) enabled research on Kellogg's distribution of pedometers in Special K	Collaboration Minor financial contribution to research Low inter-organizational influence and interdependence	Advances in population intervention research Assessment of health impact from sales marketing associated with active living	Risk of negative external perception for health research institute partnering with food industry	Research component independently run and monitored by CIHR

Title & Description	Structure	Rewards	Risks	Risk Management
Shape Up Somerville (49)				
Systems-change approach to building and sustaining a healthy community Designed to improve energy balance by making small changes in environment, e.g. local community restaurants	Community-based partnership Cross-sectoral collaboration Inter-organizational influence over program through adaptation to challenges identified by restaurant managers	Opportunity to learn from small businesses to inform aims of program and future population interventions Small business hoped to gain exposure through program marketing	Small businesses assumed financial risks by taking part in program	Program managers learned that better supports should be in place for future interventions to mitigate risk for small business
America on the Move (AOM) (48)				
Non-profit organization created to promote evidence-based behavior change Partners must have mission alignment with AOM and provide research-based and low cost services to users (ex YMCA) Sponsors are large foundations or consumer service providers (ex Anthem Blue Cross and Blue Shield Foundation)	Co-branding (partners can repurpose AOM content; sponsors provide financial support for AOM in exchange for co-branding and exposure on AOM resources) Goal alignment emphasized at partner level where no financial exchange takes place	Procurement of resources to operate programming Increased exposure for all parties through co-branding	Potential interference in AOM programming	AOM: retains the right to determine program design and execution; attempts to fund programs from multiple sources; only accepts funds from external parties if doing so does not impact its objectivity

Title & Description	Structure	Rewards	Risks	Risk Management
EPODE International Network (47)				
Community-based capacity-building approach to reducing childhood obesity Major founding partners include Nestle and Coca-Cola Many partners at local level Private funding varies by community ranging from 0-100%	Large scale, centrally coordinated community capacity building approach Public-private partnerships supported through network and central to local level organization	Procurement of funding to run EPODE programming Image improvement for food and beverage industry partners	Corporations are permitted to refer to EPODE in their CSR activities; observers argue that this type of sponsorship provides leverage when lobbying against regulatory measures	Private partners commit to non-interference in program content, must not associate the EPODE program with any product promotion, and cannot include their own branding on EPODE materials

3.4. Foundations for successful partnerships

Our review of examples of CSPs to address obesity and NCDs highlights the wide range of relationships, their relative risk of and potential for COI, and the different extents to which the public or nonprofit sectors can engage with industry. For practitioners considering engagement with the private sector, and the food and beverage industry in particular, decision-making can be a challenge. Here we review how trust, COI, and monitoring and evaluation are key considerations in moving forward.

3.4.1. Trust

Although a growing field of trust research is expanding the theoretical and empirical means of examining trust (55), little has been done specifically as it relates to CSPs for obesity and NCD prevention and control. Current research does recommend that new relationships begin with low stakes, which are to be raised as trust is built up (55). Solomon and Flores (56) describe several categories of trust, including simple, blind, and authentic trust, as well as cordial hypocrisy. Simple trust is trust that is taken for granted and requires no reflection or conscious choice, whereas authentic trust cannot be taken for granted, is carefully considered, and must be continuously cultivated. Blind trust is present when evidence for distrust is rejected or denied, and it requires self-deception; deception, however, in the form of a facade of goodwill and congeniality is labeled cordial hypocrisy. Cordial hypocrisy is destructive to teamwork and makes communication impossible. At the end of the spectrum where trust is low, the complexity of navigating a CSP grows.

The role of trust in the success of CSPs should not be underplayed. In comparing the effectiveness and efficiency of cross-sectoral and intra-sectoral partnerships in public sector management, Andrews and Entwistle came to the following conclusion: “[I]t is conceivable that sociopsychological aspects of partnership—such as trust, goal alignment, and quality of communications—are a more important determinant of performance than either the resources or the focus of intersectoral collaborations” (25 p693). A major issue in partnering for chronic disease and obesity prevention has been the trustworthiness of the food and beverage industry. The history of industry practices that undermine public health efforts suggests that blind trust is not an option, and

authentic trust has not yet been achieved. The basis for moving forward will depend on managing COI and improving on existing methods of monitoring and evaluation.

3.4.2. Conflict of interest

Like trust and partnership, COI exists along a continuum from convergence of interest to perceived and actual COI. Ethical and moral issues must be considered when addressing COI (57), and clarification of the roles, practices, interests, and duties of partners in a CSP involving the food industry is also needed. Marks and Thompson (30) recommend that a temporal lens and a comparative lens are necessary when assessing whether COI is avoidable. In the former, one asks whether a conflict, if not avoidable altogether, could be eliminated over time. The latter adopts a broad comparative examination across institutions, professions, and national borders. As noted previously, considering CSPs in the broader context of interests, as opposed to goals, may assist with decision-making about COI. Brody (58), for example, suggests that conflicts arise when individuals or organizations enter into a set of arrangements that might tempt them to put aside their primary interests (such as advocacy for public health) in favor of a secondary interest such as financial well-being. He therefore views the relationship between the AAFP and Coca-Cola as a COI, as it meets the definition of threatening social trust. Freedhoff calls for an expanded definition of COI wherein, regardless of the measures taken to mitigate corporate branding in health-promoting activities, the fact that industry can refer to their philanthropic activities in lobbying efforts to bolster their image should read as a COI to the public health sector (54).

Perceived COI often exists when the private sector provides the public or nonprofit sector with funding, even if the funds are provided without restrictions such as in the AAFP Coca-Cola example or in the more common industry sponsorship of academic research. In defending the AAFP's decision to partner with Coca-Cola, AAFP president Lori Heim argues that "examined only in a philosophical vacuum, issues of [COI] and the underlying ethics governing behavior become an ideological straitjacket" (59 p359), echoing past criticisms of the stifling effect of strict COI guidelines on pharmaceutical research (50). Industry watchdogs Nestle (39) and Brownell and Battle Horgen (36), among others, have countered the argument that action on CSPs for health promotion and education should and can advance in the absence of clear guidelines on COI as it applies to the food and beverage industry. Concern about potential COIs as

they relate to prevention and control of NCDs also led a coalition of 150 organizations to issue a “Statement of Concern” (61) to the President of the UN General Assembly in September 2011. In their statement, the Conflicts of Interest Coalition suggests the first steps to addressing COIs is to clarify the distinction between business-interest not-for-profit organizations (BINGOs) and public-interest nongovernmental organizations (PINGOs) and to develop a code of conduct for interacting with the private sector. Indeed, an important step in the move toward a consensus on partnering with industry will be the clearer use of language around partnering and defining the status of the actors involved, as well as the aforementioned need to distinguish between the interests and goals of each sector.

3.4.3. Monitoring and evaluation

Built-in processes for review and evaluation as well as good governance, which includes a mechanism for reviewing accountabilities, are critical success factors for all complex CSPs. There have been many calls to research effectiveness and conduct evaluation of public–private partnerships in the face of little existing evidence (6,18,37,62,63). Developing rigorous means of evaluating CSPs will prove challenging in the current landscape in which experts have demonstrated no common understanding of what public–private partnerships consist of in spite of having great enthusiasm for them. Furthermore, stakeholders are often reluctant to sacrifice flexibility and expediency in favor of methodological rigor (18). Further work must be done to bridge the operating paradigms and goals of government, the private sector, and public health organizations in order to develop greater demand for evaluation.

Evaluative practice in regard to CSPs should, where possible, consider the place of a specific CSP in relation to the broader issues of COI. Barr (18), for example, has developed a research protocol that, in addition to considering management aspects such as administrative structures of the parties involved, also characterizes the market system in which the public–private partnership operates. He further recommends that equity be considered an indicator in evaluation because it corroborates the mandates of the WHO and public health in general. Integrating this frame into the evaluation of CSPs can help surface goal misalignment between organizations and their practices.

Closer monitoring and surveillance of industry behavior and compliance with regulation and voluntary pledges is necessary to build trust and help stakeholders assess the suitability of partners (6,40). One example of this is the auditing of the Healthy Weight Commitment Foundation, currently being conducted by the independent and trusted Robert Wood Johnson Foundation. Monitoring should also be extended to global markets and taken into consideration by public health organizations as part of their integration of an equity lens into evaluative practice. This is particularly true if public health is to fully embrace a social determinants approach. Support for increasing action on NCDs as part of a global health platform is growing. Although NCDs are associated with poverty and other broader determinants, especially in LMICs, community-based initiatives to address obesity and NCDs currently taking place in HICs are informed by western evidence emphasizing proximal determinants (32). The interactions between industry and the public and non-profit sectors continue to shift focus away from broader determinants associated with the food system and toward physical activity in particular as a key determinant of health. This and other relevant issues should be taken into consideration in macrolevel evaluations of the evidence base being constructed through CSPs, along with transnational corporations activities in vulnerable, less regulated LMIC marketplaces.

3.5. Conclusion and implications

The debate around CSPs between public health and the private sector eludes easy answers or simplistic analyses. In this review, we have considered various approaches to CSPs for NCD and obesity prevention and identified issues at the heart of public health's current dilemma about working with the private sector. Throughout the literature, public health advocates have identified several areas for improvement. These include the need for clearer language and definitions regarding partnering; stronger monitoring of industry practices in both HICs and LMICs; and the balancing of both interests and goals in decision making regarding CSPs. To this end, public health is reconsidering its role in addressing today's complex health problems. Teutsch and Fielding (2) argue that the field needs a clearer identity and needs to brand itself to convey "a set of important values and credibility" (p296). Poorly chosen partnerships with industries implicated as drivers of the obesity and NCD epidemics for easy money have tarnished public health's brand and the reputation of many health organizations.

Even though the need to address obesity and NCDs is urgent, there will be no quick solutions for a problem that has developed over decades and will require sustained long-term interventions to revert. We would do well to take the long-term view in regard to CSPs involving the private sector and their potential benefits and consequences.

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Chapter 4.

Developing co-funded multi-sectoral partnerships for chronic disease prevention: a qualitative inquiry into federal government public health staff experience

4.1. Background

The complexity of chronic disease has prompted calls for an “all-of-society” approach that engages partners from a variety of sectors to explore, develop and implement potential solutions (1,2). Multi-sectoral partnerships have been proposed as a key means by which governmental public health organizations can work with other sectors to develop coordinated and sustained action to improve population health while leveraging the resources, knowledge and expertise of the private and non-profit sectors (3–5). As part of the Canadian federal government’s efforts in this area, the Public Health Agency of Canada (hereafter referred to as the “Agency”) has developed and implemented the *Multi-sectoral Partnerships to Promote Healthy Living and Chronic Disease* program (6) (hereafter referred to as the “MSP program”). The MSP program represents a reconceptualization of the Agency’s traditional approach to funding health promotion and supports multiple partnership projects. Eligible organizations are invited to submit a Letter of Intent (LOI) outlining an intervention that addresses common risk factors for chronic disease, will demonstrate measurable results, and has the potential to be scaled up to other populations or settings within Canada. If accepted, applicants are invited to proceed to a full proposal submission, at which point they must have met a key criterion—the procurement of matched funding from the private sector or other non-taxpayer funded sources. The total request for federal funding for each project must be between $200,000 and $5,000,000, with interventions lasting from 2 to 5 years.

Several aspects of the MSP program make it a relatively unique environment for federal governmental public health personnel. These include the scale and complexity of the interventions under development, the engagement of private partners as co-funders, and a shift from transactional funding arrangements to ones in which staff can play an active role in working with applicants to develop full proposals and, in some cases, the interventions themselves. This exploratory qualitative study aims to understand the

experiences of Agency staff working in the initial years of the MSP program (approx. 2013-16) such that we might theorize about the process of developing co-funded MSPs from the perspective of federal government public health employees. While the literature on multi-sectoral partnership development is considerable and diverse (7), we expect that its applicability will have some limitations in regard to this particular program. Much of the literature on the practice of multi-sectoral engagement for public health in North American settings relates to inter-organizational efforts operating outside of a grantmaking context (8,9). Literature specific to engagement between the private sector and governmental health departments frequently relates to health care delivery (10,11) or, when specific to chronic disease prevention, to the benefits, challenges and political implications of engaging the food and beverage sector in efforts to establish healthier environments (5,12,13). Given the lack of context-specific literature on developing co-funded models of governmental multi-sectoral engagement, we expect that this study's findings will prove informative for organizations considering similar approaches.

4.2. Methods

4.2.1. Data collection

All personnel engaged in brokering or developing partnerships within the MSP program were invited to take part in semi-structured interviews about their role at the Agency and their experience in the MSP program (approved by the Simon Fraser University Office of Research Ethics; # 2016s0256). We specifically asked participants to arrive at interviews prepared to describe a positive and challenging experience about their work in developing partnerships. This approach was informed by Ambrosini and Bowman's (14) approach to eliciting and documenting tacit knowledge through narratives, such that participants could communicate in a manner reflective of our natural tendency to frame our experience as stories that come to represent an organization's collective memory. Where possible, interviews were conducted in person at the Agency's office to build rapport and situate participants in a familiar setting. Two interviews were conducted over the phone. Interviews were approximately 60 minutes long and oral consent to participate in this study was obtained from interviewees.

Follow up focus group sessions were conducted to build on emerging themes drawn from the individual interviews. Participants were sent a brief guide prior to their

focus group session with broad questions to prime their thinking. Focus groups were structured by organizational role to facilitate deep dives into issues related to key themes based on commonalities among work roles. Each focus group session was approximately two hours long and conducted at the Agency's offices. Interview and focus groups were digitally recorded, transcribed verbatim, checked for accuracy and uploaded into NVivo qualitative data analysis software (QSR International Pty Ltd. Version 11, 2014).

4.2.2. Data analysis

Data analysis occurred in two phases. Firstly, individual interviews were analyzed in NVivo using thematic analysis (15,16). This process entailed familiarization with the interviews as full texts, inductive open coding, and subsequent higher-level coding to identify recurring themes in the data. These preliminary themes were used to inform questions for the semi-structured focus group sessions. Focus group session transcripts were then integrated into the data set and coded using the same initial process.[1]

During the second phase of analysis we adapted Strauss and Corbin's (17) coding paradigm in order to further our understanding of the Agency's process of developing co-funded multi-sectoral partnerships as situated in the context of the MSP program. We re-examined the results of our thematic analysis through an iterative process that shifted between closer and more abstract configurations of our codes in order to identify the central analytic core of study participants' experiences. Further use of the coding paradigm allowed us to identify the strategies employed in response to this central set of experiences, and the outcomes that emerged from this process of experience and response. We also identified program- and partnership-level factors that informed the contextual conditions in which those processes took place. Developing our model enabled us to explore relationships between these data points and consider actual and potential feedback mechanisms at play.[2]

[1] For more detail see Appendix A:. Methods and methodologies supplement

[2] For more detail see Appendix B: Data coding supplement

4.2.3. A note about language

Over the course of this paper we refer to those individuals and organizations with whom the Agency engaged as “partners,” “potential partners” and “applicants,” depending in part on which aspect of their work is under discussion. That these terms can be used interchangeably reflects the fluid and complex nature of the relationships under discussion, as will be described in more detail further on. We also occasionally employ the term “case file”—language also used by Agency staff—to describe individual instances of partnership and proposal development.

4.3. Results

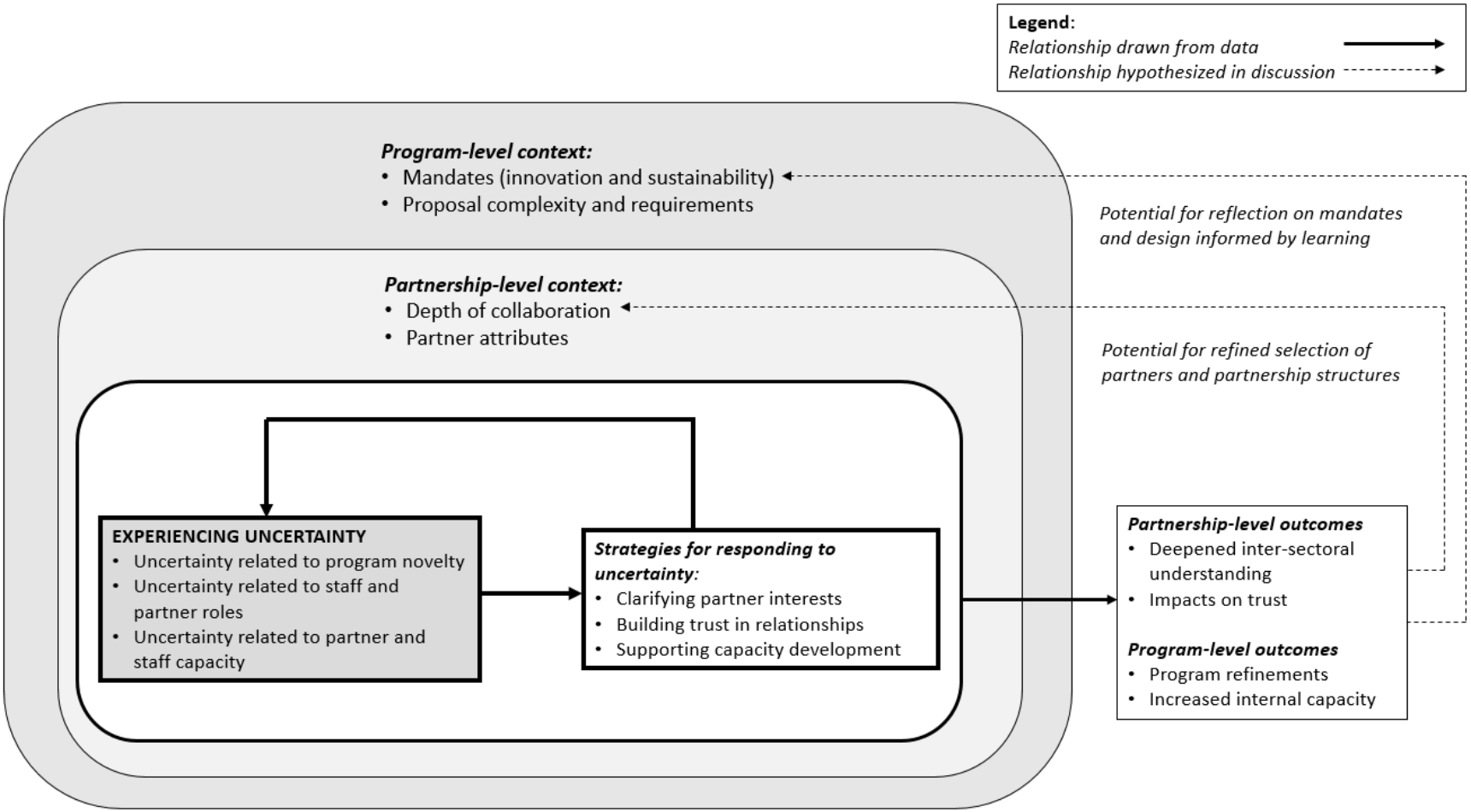
All personnel invited to participate in this study elected to do so. Upon completing the individual interviews it was determined that one participant’s work experience did not meet the study criteria; the interview was excluded from analysis and the individual was not invited to attend the focus group sessions. At the time of individual interviews the remaining 12 participants held primary job titles of policy analyst, grants and contributions administrator, or manager. Ten interviewees participated in focus groups (management focus group, n = 3; grants and contributions focus group, n=4; policy focus group, n=3). The remaining 2 participants were unable to attend due to time conflicts. Interviewees had public health backgrounds in a variety of governmental settings and with varied years of experience, with several having also had previous experience working with or in non-profits. One interviewee also stated they had previous experience working in the private sector.

4.3.1. Experiencing uncertainty

Study participants’ accounts conveyed their experiences of uncertainty, or a lack of sureness, about various aspects of the MSP program itself or interactions with partners within it (Figure 4.1). These experiences were informed by the broader, program-level context established by the MSP program’s complex design and mandates around fostering innovative practice and leveraging funds from private sources. They were also informed by the partnership-level contextual conditions unique to each case file, which represented various combinations of intervention type and complexity, organizational interests, stakeholder relationships, and depth of collaboration between

the partners involved. Study participants identified high variation in the depth of their involvement in developing a proposal or intervention, with some arriving to the MSP program “fully cooked” and others needing significant input or resulting from collaborative, co-creative efforts. The uncertainty that emerged from these diverse conditions was related to three main areas: the ways in which the MSP program presented a novel approach for federal governmental practice; the roles played by study participants and partners in the context of a co-funding partnership program model; and concerns regarding capacity, both within the Agency and in applicant partners.

Figure 4.1. Experiencing Uncertainty During the Development of Co-funded Multi-Sectoral Partnerships



Uncertainty related to program novelty

The MSP program's mandate to address upstream determinants and shift away from a disease-specific prevention approach enabled study participants to reach out to stakeholders working in non-traditional intervention areas. While staff were excited about the opportunities afforded by the exploratory nature of this work, they also reflected on the overwhelming scope of their expanded mandates, as noted here:

> Where I used to work, there was a cancer program, there was a diabetes program. So you were very, very focused in terms of subject matter. And now we are like, "healthy living" is just – boom. It is all over the map.

Staff expressed uncertainty regarding their lack of content expertise in areas that fell outside of their previous work experience, such as the built environment, and noted the investment of time required to familiarize themselves with unfamiliar stakeholder landscapes. Staff also noted the risks or "potential minefields" associated with interfering with those established stakeholder networks in which trust and mutual understanding had been established over time.

The MSP program's efforts to leverage non-governmental financial resources in the form of a matched funding requirement also marked a significant shift in approach for federal public health. Staff noted several instances in which applicants had difficulty procuring matched funding, resulting in frustrating situations where otherwise completed applications lay in an uncertain limbo until this requirement was met, as described here:

> They don't find the money. They don't find matched funding. It comes down to as simple an issue as that, and that is always tough.

Study participants noted the dilemma the MSP program helped to create by allowing applications to be developed without matched funding in place until its latter stages, and reflected on how their deepening relationships with collaborative partners during the development process compounded tension. As one study participant noted:

> You kind of develop that relationship as they are trying to build and find their private partner base, and it is really hard….It is almost like we have created this problem.

Working with private sector partners posed another source of uncertainty for Agency staff, the majority of whom were more familiar and comfortable with the non-

profit sector and its mandates. Here, a study participant reflects on their experience with a novel sector:

> [The private sector partner] said make sure you include a return on investment and analysis and that is when you know you are talking to a totally different sector.

Private partners varied in size and type with examples including individually owned and operated small business, pharmaceutical corporations, financial institutions, and food and beverage partners. While study participants identified tobacco and alcohol as being clearly off-limit private partners, the boundaries were less defined around engaging with other potentially controversial partners such as those in the food and beverage sector. Interviewees described learning about the private sector's communication styles, motivations and trustworthiness as they came across inter-sectoral differences in approaches.

The MSP program also established open timelines and a flexible work environment that introduced a type of procedural uncertainty that differed from traditional government ways of working. Staff noted the marked difference between this state of continuous decision-making and problem-solving without strict guidelines, often over lengthy periods of time, to the former traditional hands-off grants and contribution approach with clearer criteria for decision-making and fixed intake dates. Staff also identified the MSP program's "permissive" culture and comfort with risk as being novel for a federal public health setting. Study participants employed the metaphor of "working in the greys" to describe functioning in a continuous state of uncertainty, particularly in the MSP program's early days when guidelines and requirements were still in development. Study participants reflected on the exploratory and unique nature of the MSP program, as in here:

> I mean we are allowed to cold call people. You have to remember, where we came from [in federal government], it was a fundamentally completely different environment.

> We are covered in terms of the authority to do this work, but there is no bible that you can reach over the side of your desk and say, "okay, this is how you do that."

Staff noted that while this open and flexible approach enabled them to respond to and pursue emerging opportunities, it sometimes complicated relations with applicant organizations, as noted here:

> Sometimes I find it a little hard, because it feels sometimes like rules change….I feel like that also poses some challenges for me because in working with partners, you need to be a bit clear about what the rules are.

Staff also noted that passing the LOI phase and entering into proposal development with Agency staff playing an active role in working with applicants implied a kind of tacit approval of the project—a potential source of problems given the uncertainty of the proposal's eventual success. In this sense the MSP program's timelines, while fostering staff's ability to take advantage of emergent opportunities, could introduce the risk of increasing applicants' expectations based on the Agency's joint investment in a project's success.

Uncertainty related to staff and partner roles

Staff expressed some doubt about the nature of their role in the MSP program, particularly between shifting between the partner and funder identities. For staff with a background in grants and contributions work, shifting from a hands-off administrative and oversight role to acting as a collaborative partner caused some discomfort, as noted by this study participant:

> I like the idea of thinking of ourselves as partner brokers and helping building these partnerships, and I do believe in our model, but I still have a hard time wrapping my head around the idea of us being a partner at the table.

Other study participants struggled with assuming the role of partner in a context of a funding program, as conveyed here:

> There are power dynamics at play, so this is very different than for example, for me when I have been in a community, and I meet with sort of several organizations to say, "Let's roll up our sleeves, and let's think about how we can address this really challenging and complicated project together."
>
> For me it is funny because we always talk about each other being a project partner, and I still struggle with that. I still think that we hold the upper hand, because they are coming to us and asking us for funding, and we are saying yes or no…and we can still be fairly directive in that sense.

Tension in the meshing of a partnership and funding model also played out in instances where Agency staff were met with resistance from applicant organizations. A recurring dynamic was one in which applicants seemed to have difficulty "getting it," in that they failed to respond to and incorporate staff suggestions on how to tailor their proposal to align with the program's mandates and requirements, as illustrated by these comments:

> They came back to us three times. Either they couldn't listen or didn't hear us. Didn't want to listen or didn't hear us in terms of what we needed to ensure that there was a goodness of fit around our priorities, and the criteria for our funding program.

> Maybe we don't understand exactly what they are saying and that is kind of a communication side, but it is frustrating.…I think what we can see is the opportunity ahead and other people come to us sometimes with their really set ideas, and our job is to kind of help them shape it to fit our program but sometimes you just can't.

Some staff associated applicant unwillingness to engage with Agency feedback with a broader resistance to, or failure to evolve with, the Agency's efforts to shift traditional partner-funder dynamics and lessen dependence on government funding. Study participants also identified situations in which applicants' receptivity to staff suggestions posed its own set of concerns:

> The ones I really worry about are the small community groups who really need that money, and they will do anything to get our money, which means sometimes they promise things in their proposal that they can't make, because they were just doing it to try and fit our model....They will bend over backwards.

Other situations occurred in which staff encouraged partner organizations with similar ideas to submit a joint application. Here a study participant reflects on the downside of these unions:

> We do have some instances where we kind of brokered a forced marriage in a way, because we wanted certain aspects to be included in our project. And those forced marriages haven't necessarily gone that well, because there hasn't been that kind of from the ground up development of collaboration and trust.

The depth of an applicant's financial need and the funding-recipient dynamic were mediating factors in establishing trust and introduced uncertainties into collaborative engagement. Staff contrasted this experience to that of working with co-funder partners, some of whom provided more money to a partnership than did the

Agency. These situations prompted their own shifts in government thinking about partnership work, as conveyed here:

> When you are trying to bring the partner who doesn't need the money, that is where the relationship feels incredibly horizontal if not inverse, because we are working harder to bring them in. We are trying to convince them to work with us and that is a different sort of relationship than what we have traditionally had with not-for-profits.

Uncertainty related to partner and staff capacity

Insufficient capacity was identified as a source of uncertainty around organizations and individuals who struggled to convert a partnership or idea into an acceptable proposal. Study participants reflected on the implications that the MSP program's demands regarding evaluation planning, the development of indicators for measurable outcomes, and pay-for-performance model had for partner organizations. As one staff member noted:

> Our research proposal requirements are extensive and onerous, and in order to handle that, it actually really speaks to capacity. We don't do this to test people's capacity. Of course not. But it does.

Staff cited instances in which individuals, particularly those without strong organizational support, struggled to master the proposal requirements or to work within the extended timelines of the MSP program, as noted here:

> This person was just not emotionally capable of withstanding the sort of the roller coaster ride a bit, would get very, very frustrated with sort of the back and forth. Really couldn't handle the back and forth.

> It was clear to us that this person did not really understand [the pay-for-performance] concept, because of the questions we were getting back from them over and over again.

Staff noted that while private partners brought their own unique capacities to partnerships and the interventions under design, their methods and focus for data collection and measurement did not necessarily align with the program's needs, as noted here:

> When you are working with a non-traditional [private] partner, they have marketing metrics that I wouldn't even being to describe or understand. But what we need is data on reach, access and behavioural outcomes.

Staff also identified lack of experience and knowledge in working with government as a capacity gap specific to private sector partners, as described here by a study participant:

> Sometimes [the private sector doesn't] necessarily have the same skills to deal with government relations in general….Most of my experience has been with [NPOs] in the past and they usually have on staff a government relations person, who really understands the lay of the land, and how to navigate it and sort of different things that really need to be considered. My experience so far with the private sector is that they don't always understand or fully understand all the implications of going in a certain direction.

For their part, Agency staff identified their own capacity needs as they navigated the novel conditions presented by the MSP program. Investigating new intervention areas surfaced insufficient content expertise, and the move into a more active partnership role was an exciting but uncertain transition for staff who lacked previous experience in partnerships. Additional needs around data collection and management, intervention design and communications emerged as the MSP program became interested in co-developing potential projects that lay further outside of the Agency's traditional comfort zone and broadened the scope of its portfolio in chronic disease prevention. Staff also noted their general unfamiliarity with the private sector, the relevance of which was dependent in part on the nature of the partnership structure and the private partner's level of involvement. Interviewees worked to position themselves and the Agency's mandates in relation to those of the private sector, as conveyed here:

> The skills involved in working with the private sector are very different than working with an [NPO whose] whole reason of being is to help Canadians….Whereas if we are looking at the private sector, the whole reason for being is profit. Yes, they might have a corporate social responsibility angle and I do believe there are people that are good people and want to do good things, but it is different, and the skills in navigating that relationship, I am not sure there is a course for that.

4.3.2. Strategies for responding to uncertainty

Agency staff developed an array of strategies aimed at addressing the uncertainties experienced in their program work, as represented in the solid feedback arrows in Figure 4.1. These strategies can be classified into three distinct but interdependent and reinforcing categories: clarifying partner interests; building trust in relationships; and supporting capacity development. Taken together, the strategies

employed by Agency staff can be understood as efforts to foster alignment on issues both intangible and structural.

Clarifying partner interests

Clarifying applicants' and the Agency's interests helped to ensure a common understanding as to what would be achieved through the intervention and how it would serve each organization. Here a study participant describes one such scenario of working with various partners to elicit their organizational needs and interests in regards to data outcomes on a particular intervention:

> So then it was a matter of trying a few different approaches to surface the issue in all partner conversations to try and understand where the misunderstanding was….We have been asking, "What is the question, like what is the story that you want to tell? What is the question that we want to answer, so that you can tell the story that kind of meets your needs." We are all going to tell different stories with this data, so it was trying to kind of surface it in a way that we could go, "okay we all understand."

Taking time to surface partner needs and expectations helped Agency staff work toward a "goodness of fit" between applicants and the MSP program's mandates and goals.

Surfacing and clarifying partner interests also served to address broader uncertainties regarding differences in inter-sectoral mandates. Agency staff described working with private sector partners to understand their motivations for investing in an intervention, without losing sight of the private sectors' broader interests. One participant described this balancing act as such:

> You can find the shared value in what we are doing together… but if there is a way to make their profit work to our advantage, then selling running shoes, selling hockey sticks, that is an okay thing.

While assessing and weighing the MSP program's fit with broader private sectoral interests was part of an ongoing and evolving conversation within the Agency, clarifying the interests and motivations represented on their specific case files helped staff to identify more immediate conflicts of interest.

Building trust in relationships

Staff identified trust in inter-personal and inter-organizational relationships as being invaluable to their work in developing proposals and partnerships. As one interviewee framed it:

> Wherever you are located, government or in a community based organization, it really is about the relationship, the relationships matter a lot….I found wherever I have worked if you know people, and you have the relationship, and there is the trust developed and you feel like it is genuine, then it really, really goes a long way.

Trust served as a conduit to managing conflict, addressing doubts about motivations, and acquiring information necessary for accurately assessing partner capacity. Interviewees pointed to the different ways in which trust manifest itself in their work, noting, for example, that pre-established trust might inform their interactions with a potential partner, while the trust established between an applicant and upper management might not immediately establish itself in their own interactions with that potential partner. The "care and feeding" of relationships was a cornerstone of staff practice, made manifest primarily through communication practices adapted to meet the needs of each individual case file and informed by the depth of collaboration required for each relationship within it. Staff also utilized a blend of individual and group communications, as noted by this study participant:

> So we have partners—government partner and the private sector and the NGO. Sometimes it means a bilateral conversation, which then kind of influences how we are thinking, and then a trilateral call and then another bilateral call with this one. So it can be a series of conversations with not necessarily everybody together.

Communicating clearly, transparently and consistently with partners was deemed important to building trust and strengthening relationships. Doing so served to keep partners apprised of what was happening within the partnership where communication was not between all parties at the table, while also keeping partners up to date on their proposal's status and any changes within the evolving MSP program that might affect it. As one participant noted:

> I have dealt with [changes in the program] by just being clear with partners. You need to know that here at this point, this is how we work. That sometimes things change, and I will tell you what I know, and if there is sort of anything that is different, as we develop and then I will do that.

Lastly, Agency staff identified measures they had adopted in order to address potential barriers to trust in relationships, specifically around the imbalance of need between themselves and applicant organizations seeking funding. Included in this was clearly conveying the risks of participation in the MSP program, as described by this study participant:

> I usually am very up front with people when I will say, "This is what is required. It takes resources to write an LOI. And to develop a full proposal and look for matched funding partners, which are required at the time we submit your proposal for approval, is a commitment of time, and resources for which you won't be compensated and for which there is not a guarantee at the end." I am very candid about that.

In addition to communicating the risks associated with participating in the MSP program, Agency staff also conveyed their appreciation of the value and assets that non-funding partners brought to partnerships. Some study participants framed this practice as a means of addressing potential power imbalances by acknowledging that, without implementing partners bringing their expertise and local connections to the MSP program, it could not achieve its broader mandates.

Supporting capacity development

Study participants embraced assisting applicants in accessing the skills, knowledge or expertise required to meet the MSP program's difficult requirements. This included educating applicants about unfamiliar concepts and increasing support in response to recurring challenges, as documented here:

> I think one of the things that we have really changed in the way that we work is we provide a ton of support to the development of the intervention.
>
> To ask someone to write a proposal, to find matched funding, to work in pay-for-performance—you can't just insist that all these conditions have to be met when people haven't worked in this way before. You [have to be] willing to provide them support, to explain what you mean, to have these very intrinsic conversations about what is a source of matched funding. What is a non-taxpayer funded source? How do you quantify in-kind?

Staff also connected applicants to academics or other specialists who could assist applicants in developing monitoring and evaluation plans, as described here:

> What we need is data on reach and behavioural outcomes. So that is always a sort of extensive and extended discussion around capacity

> building, capacity understanding. So at that point I had suggested that we look to broker a relationship with a university based evaluator who would be able to support the type of data that we needed.

Another area in which applicants sometimes lacked experience was in navigating jurisdictional issues and policy landscapes, as in this example in which an interviewee describes helping an applicant struggling in unfamiliar territory:

> We provided support. We were a sounding board. If they met some resistance, or you know there were some questions or sort of difficult situations, they would kind of come back to us, you know maybe, “What should we do next?” So a bit of guidance and being there to help you and guide you, providing any knowledge that we have around the policy issue or the landscape.

Study participants also took measures to build capacity within the Agency, such as acquiring partnership brokering training and accessing resources within other governmental to support intervention development and design. While some gaps in capacity were addressed through formal measures, study participants emphasized the critical importance that experiential learning played in building their skills in partnership brokering and negotiating, working with new sectors and partners, and developing interventions that lay outside of the traditional scope of public health practice. Open flow of communication, diversity of content expertise, and the combination of policy and grants and contributions experts on case files were all identified as factors enabling exchange of knowledge and expertise within the Agency.

4.3.3. Partnership and program level outcomes

Over the course of their accounts, study participants identified outcomes that emerged from their work in the MSP program. These emerged in relation to two levels—the first being the partnerships themselves and relationships within them, and the second the broader level of the MSP program.

Partnership-level outcomes

Study participants identified a deeper understanding of the sectors with whom they engaged as a beneficial outcome from working closely and through complex interactions with program applicants. Working collaboratively to understand each other’s interests, support each other’s capacity and invest time in the overall health of inter-

personal and inter-organizational relationships all contributed to this phenomenon. In regards to the non-profit sector, this resulted in deepening Agency staff's already high respect for the sector's capacity and dedication to the public good, as noted here:

> Now more so than ever, it amazes me what a non-profit can do with the resources that they are given, and how hard they work.

Deeper relationships with private sector partners resulted in a greater understanding of the sector's motives and work styles, and appreciation for their marketing and data collection and management capacities. Given the lack of general experience that staff had had in working with private partners at the time interviews were conducted, this was an outcome still in development and largely informed by each interviewee's experiences, as is reflected in this example:

> We went to a sort of new level of mutual trust, and certainly with respect to this new private sector partner, I was blown away, and I felt, these guys really get it, like they completely understand this program. They are completely behind it.

Study participants also speculated that private sector partners' understanding of government and its complexities had evolved, as noted here:

> I find [private partners] are learning about how to work with government more, which I think it is good for them down the road. I think they are gaining some insight [that we] are not putting roadblocks just for the sake of roadblocks….I find they are learning and understanding about accountability that we have to the Canadian public.

This exchange of learning was further characterized by the high value that staff placed on the more deeply collaborative partnership arrangements that facilitated them. Here staff reflect on the general value of active engagement:

> We are certainly becoming more active partners than we were, certainly at the beginning of our process, and I think that we are starting to see just how valuable it is, and often for our partner organizations, they like it. They want us to be an active partner, because there is a reason they came to us, …not for just our money.

> We don't have just the relationship with the one organization that we are funding, but actually the private sector organization is very involved and we have a close relationship with the private sector organization….We are all one big team, and that is how we approached this, and to me that is a model of success.

Strong collaborative engagement presented a double-edged sword of risk and benefit. In addition to the *deepened trust* developed through inter-sectoral engagement, interviewees experienced that the negative outcomes of *broken trust* and risk to reputations and relations were acutely felt when breakdowns occurred. This was most present when the Agency ceased development on a project after a significant investment of resources by themselves and potential partners—a rare but critical incident for Agency staff in which their uncertainty about a proposal could not be addressed in spite of their efforts. Staff also identified the need to draw boundaries around their personal investment in relationships and the responsibility they felt toward applicants. As one study participant noted:

> I care about the people and the projects, because I am a public health person by background. My heart is on my sleeve. I care about people and the work I do, but I still always have to keep this little guard up, right, [in case] things go sour, which they can.

Program-level outcomes

Program-level outcomes were identified from staff's reflection on the ways in which the MSP program itself had evolved since its inception. Interviewees' observations pointed to *program refinements* in the form of more finely-tuned processes as they pulled back from the more open and exploratory pursuit of potentially interesting ideas in favour of more selective-decision making about an intervention's value to the program. This shift was informed by factors such as incoming learnings from interventions already in the field, as well as study participants adapting their practices in order to identify potential "deal-breakers" earlier in the negotiation process, as suggested here:

> The idea that indicators would drive my discussions, negotiations, collaborations, I wouldn't have said that a few years ago; but really, it is a very clear way to see whether we can work together at all.

Study participants also spoke of the MSP program becoming more selective about what partners might be best suited to the program. In particular, staff differentiated between non-profit organizations who demonstrated a more favorable orientation towards the MSP program's mandates and goals and those non-profit organizations who seemed less likely to move away from their historical mandates and ways of operating, as reflected on by this interviewee:

> Some [not-for-profits] are more ready and willing than others….Some take more time to come around to that and then there are a portion of them that haven't been able to….. You get a mix of all kinds from the [NPO] community, where some are willing to work, some are able to work, and then there are those who, there are those who can't or won't.

Finally, while study participants couldn't speak to the longer term effects of their capacity development efforts for partners, they did point to increased internal capacity and learning acquisition as outcomes of their early experiences in the MSP program, as noted here:

> I think in terms of my work, I feel like I have stretched myself a lot more. I feel like I know more. I can do more. I can handle more now.

> I think as we learn more about these new types of projects, and these P3 approaches, our internal capacity is growing, that we won't need to relay on those intermediaries as much in the future.

4.4. Discussion

Our study found uncertainty to be a central theme underlying federal governmental public health employees' experiences as they developed multi-sectoral partnerships to support chronic disease interventions. The uncertainties we identified emerged in response to specific conditions established by the MSP program, which in turn represented a shift from traditional governmental ways of working in terms of roles, inter-sectoral relationships, mandates, complexity and expectations. Our findings illustrate what the increasingly popular practice of multi-sectoral partnership working looks like in this program context, and highlights potential uncertainties that implementers of similar approaches might expect to encounter.

One stream of our findings relates to procedural concerns emerging from the MSP's proposal requirements, specifically regarding applicants' capacity to develop interventions at the scale and technical specifications required under the MSP program's mandates. These findings reflect the proposition that individuals struggle in even modest levels of complexity, and particularly when their capacity is incommensurate to the complexity of a task before them (18–20). While they could be challenging and required an investment of time and resources, capacity gaps in regards to knowledge and technical expertise presented a relatively straightforward path for problem solving through information acquisition, knowledge exchange, and the provision of structural

support to struggling partners. The MSP program's conditions enabled this process, in that Agency staff were prepared and willing to play a supportive role for potential partners within open timelines that allowed this development to take place.

Our findings regarding the Agency's interactions with the private sector echo common inter-sectoral uncertainties related to working with unfamiliar sectors, as Agency staff adapted to private sector cultural differences around performance measures, competencies, methods and pace of decision-making (5,21). The increased inter-sectoral understanding between government and the private sector noted in our findings also suggests that the MSP program might be fostering the type of inter-cultural exchange that is frequently cited as a rationale for engagement with the private sector (4,22). Agency staff's experience with the private sector was, however, very much in emergence given their relatively limited experience in comparison with the non-profit sector. The private sector partners described in interviewee accounts were also highly diverse in institutional scope, ranging from individually operated businesses to large multi-national corporations. This in turn presented conditions unique to each case file in regards to elements such as potential conflict of interest and power differentials. Our findings suggest the heightened value of experiential learning and the development of individual intuition and expertise in navigating interactions with new and diverse partnership pools, as the Agency continues to develop its approach to managing conflict of interest in this new arena.

When working with potential non-profit partners Agency staff sometimes experienced tensions in identifying joint interests and finalizing proposal details. Traditional thinking in inter-sectoral engagement posits that collaboration between government and the non-profit sector will be less complicated than with private partners—an assumption based on the long history of governmental and non-profit collaboration and their shared values regarding serving the public's interests (23). While this may be the case in other collaborative partnership settings, Agency staff's experiences of difficult back and forth negotiation with non-profit partners lead them to question applicants' motives. The dynamic identified between the Agency and some NPOs resembles cordial hypocrisy—a façade of congeniality that prevents honest communication and masks distrust and cynicism (24). It may be reflective of a broader trend in which NPOs have conveyed their discomfort with funders' push to partner in spite of mixed evidence as to its overall effectiveness (25–27). Organizations' natural

tendency to view their own approach as being particularly needed—a trait that arguably makes achieving true shared responsibility in partnerships a relatively rare feat (28)—may also have contributed. Regardless of its source, our results suggest that the tensions experienced between the Agency and NPOs complicated two commonly accepted and related cornerstones of partnership work—the identification of aligned interests and the development of "genuine" trust such as that cited by Agency staff as being present in their more successful relationships (5,29,30).

The challenges that emerged during these negotiations also speak to the implications of developing multi-sectoral partnerships for public health within a grantmaking context. Theorists have identified multi-sectoral engagement as operating on a continuum ranging from one-way philanthropic funding dispersals to highly collaborative ventures in which organizations' missions and activities begin to merge into collective action (26,29). The MSP program's design situates partnerships somewhere between these two ends of the spectrum, depending on the context of each case file. While purely transactional relationships may not require much inter-organizational dialogue to reach agreement, partnership studies suggest that, for more collaborative partnerships, the act of engaging in joint problem definition and establishing a course of action can be a key means for alignment interests and building trust. This process of developing a "narrative coherence" (25) about a problem and how to address it is also considered an important stabilizing antecedent to successful collaboration (25,26,28). The grantmaking context—in which the Agency has final approval over funding allocation, requires projects to align with its organizational mandates, and operates on a pay-for-performance structure—limits efforts to developing this narrative coherence in situations where organizations may be motivated to procure funding for their own activities. The uneven power differential that was also introduced by this context was acknowledged by Agency staff, in some instances challenging their identity as a collaborative public health practitioner. Their efforts to address these imbalances echo recommendations from the literature; namely, to provide resources to level the playing field, reassure partners as to the value of their role, and engage in meaningful communication with partners at all phases of the process (25).

The grantmaking context and its implications for multi-sectoral engagement also echo lessons found in the emerging literature on the context-specific dynamics of trust (8,24,31,32). Research suggests that, while pre-established trust can ease the

partnership development process, changes in context such as those introduced by the MSP program can exert a disproportionate effect on established relations (31). Agency staff's emphasis on nurturing and maintaining relationships is in keeping with the notion that trust is dynamic and receptive to external conditions, and as such must be constantly cultivated in order to serve to reduce uncertainty, rather than become its source (24,32). It is also worth noting the important role that trust in inter-personal relationships played in Agency's staff ability to navigate the challenges that emerged within the MSP development process. These relationships represent a form of affect-based trust—that is, trust emerging from an emotional bond that enables its participants to engage in leaps of faith above and beyond those supported by a more rational, cognition-based trust (31). As such it is a particularly valuable asset for the navigation of the complex inter-organizational relations that co-evolve with inter-personal relationships over time.

4.5. Implications for practice

We propose the following takeaway messages for organizations interested in implementing a multi-sectoral partnership approach similar to that of the MSP program. First, while the implementation of a more flexible approach situated within governmental broader mandates presented opportunities for Agency staff, it also introduced uncertainty for potential partners engaging with an evolving system. Clear and transparent communication, an adaptive approach to responding to emerging concerns, and staff comfort with uncertainty were all necessary organizational characteristics for navigating multi-sectoral partnerships in these conditions. Second, organizations should anticipate the potential for resistance to government's interest in being a more active partner, particularly from traditional funding recipients. Staff should be equipped to recognize and understand potential power dynamics as part of their partnership brokering skill set, and be able to assess their implications for successful partnership development. Third, our findings suggest that organizations should consider playing a supportive, capacity building role when changing their expectations of traditional partners, and be prepared to invest in internal capacity building practices. Lastly, our findings also point to the value of investing time in building and maintaining relationships, given their potential to prevent other costly breakdowns during partner engagement. These takeaway messages also echo calls for repeat cycling with funding recipients as a

means of maintaining and building upon the gains made through these aforementioned processes (27).

The outcomes identified in our findings suggest that Agency staff have reflected on the relative suitability of potential partners with the MSP program and the value of engaging in higher forms of collaborative engagement. These findings suggest the potential for thinking strategically about partner and partnership structure selection (inner dotted feedback line, Figure 4.1). The application of tools such as Austin and Seitanidi's (33) collaborative value creation framework could contribute to a more nuanced and formalized identification of value potential in multi-sectoral engagement, above and beyond those associated with the interventions they support. This process could also further the evolution of broader program mandates as they are reviewed in relation to the expected and actual outcomes emerging from multi-sectoral engagement.

4.6. Implications for research

We echo the call of many researchers for a more robust research and learning agenda on the subject of multi-sectoral partnership development (5,34,35), specifically in relation to the value associated with a more developed typology of partnership engagement (4). Developing this taxonomy could provide a critical unpacking of the many types of engagements that are frequently grouped under the term "partnership," regardless of level of interaction between players. Linking research that analyzes the partnership development process in various program contexts with the mid- and long-term outcomes of partnerships in practice would also contribute to a deeper understanding of partnership value in relation to depth of collaborative engagement.

Our study also points to the value of conducting qualitative studies aimed at eliciting and documenting practitioner knowledge. We agree with the sentiment that complex problems and their policy responses require broader and more nuanced conceptualizations of evidence than is traditionally prioritized by government (36). Given that tacit knowledge, or practice wisdom, can provide valuable information regarding the practical challenges and unintended consequences of policies and approaches in action, we see value in expanding and refining the application of qualitative methods for tacit knowledge capture.

4.7. Limitations

This study is limited to presenting the perspectives of Agency staff only and does not represent the views of other participating partners.

4.8. Conclusions

Multi-sectoral engagement with a co-funding component will likely become increasingly more popular with governmental agencies seeking innovative ways to address complex problems with limited resources. The MSP program represents one of several potential approaches to engaging the governmental, not-for-profit and private sectors. This study documents some of the benefits and challenges associated with this approach, as well as the strategies employed by Agency staff to address them. Our study points to the need for more context-specific studies of partnership development, and the need to situate specific approaches to multi-sectoral engagement within the broad range of options available to governmental organizations.

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Chapter 5.

Discussion, reflections and conclusions

Over the course of the three preceding chapters I have examined various aspects of policy and partnership practice for obesity and NCD prevention, informed by an interest in how they relate to the systems in which they operate. In this chapter I reflect upon the findings presented in this research, revisiting each chapter individually. For Chapters 2 and 3 this includes a review of relevant developments in the field that have occurred since the time of their writing. I conclude this chapter with a summary of my contributions to the field, followed by some thoughts as to how public health might help to advance the application of a whole systems approach (WSA).

5.1. Review of chapters 2-4

Chapter 2: Systems science and obesity policy: a novel framework for analyzing and rethinking population-level planning

In Chapter 2 we noted Lang and Rayner's (1) concern that the boom in policy activity around obesity would result in a "policy cacophony—noise drowning out symphony of effort." As the authors state, "this cacophony is not helpful because policymakers need coherent directions on which they feel they can deliver" (p166). Over a decade since their writing, this challenge persists. If anything, our evolving understanding of complexity begets not so much solutions, but rather more complexity. Applying a systems lens that increases our understanding of system feedback loops and the potential for unintended consequences, while necessary, reminds us of Sterman's (2) warning that—particularly in complex environments—today's solutions can become tomorrow's problems. Barnhill et al. (3), for example, note that if the dietary recommendations for fish consumption for improved diets were actually met at a population level, the oceans would soon be depleted of stock. Other seemingly straightforward policy interventions, such as a proposed tax on sugar-sweetened beverages (SSBs) and other junk foods, have been met by industry adaptations intended to limit their effectiveness, and have been deemed by others as potential sources of increased inequity and stigma for already marginalized populations (4). Additionally, an enhanced understanding of causality, feedback and the effect of

mediating variables on intervention effectiveness has caused experts to question the accepted evidence base regarding common components of population health interventions (5).

On a more positive front, evidence reviewing interventions for obesity and NCDs *does* support the need to tailor interventions locally to account for mediating variables, while also engaging local stakeholders in learning systems that link knowledge transfer from front line practitioners to decision-makers (5–7). These findings reinforce calls to view policies and other interventions for obesity as events in systems and living experiments (8). They similarly support recommendations that governments and organizations adopt adaptive learning practices with built-in feedback mechanisms that ensure information is communicated to the appropriate parties in an accessible manner (9–11). Perhaps most importantly, the success of these endeavors depends on institutions adopting an operating paradigm that supports a culture of learning and experimentation.

Over the past few years, an emerging body of evidence points to the value of shifting away from an approach that focuses solely on obesity reduction as a desired goal for population health planning. Malakellis et al. (12) conduct a systematic review of 64 obesity prevention programs for children and adolescents and find that, of the small percentage that were successful, very few were conceptualized as purely obesity prevention programs. This leads the authors to conclude that prevention may be best approached through tackling broader health issues and complex interrelationships. They also note that, while modifiable lifestyle behaviours are linked to mental health outcomes among adolescents (their population of interest), few obesity prevention interventions account for mental health outcomes. In an additional evaluation of obesity prevention programs, Malakellis et al. (12) also present results that demonstrate the effectiveness of incorporating specific mental wellbeing objectives into community-based obesity prevention efforts informed by systems thinking. These findings point to future ways in which a whole systems thinking could further an approach incorporating various indicators of well-being, and positions individuals as being represented by more than their BMI in a manner that might prove fruitful for population health. In this regard the British Columbia report we highlighted in our results—*From Weight to Well-Being*—may have been ahead of its time.

Since our article's publication, several scholars have employed our approach to coding and analyzing strategic documents and population health plans, while also expanding on its utility through the inclusion of additional methods and analyses. Durham et al. (13) compliment their descriptive analysis of recommended activity to prevent hearing loss in Australian Aboriginal children with key informant interviews. As such, the authors are able to surface systemic barriers to the successful implementation of recommended activities, such as the challenges stakeholders experienced in implemented inter-agency collaboration due to a lack of formal governance mechanisms and high-level leadership. Their approach represents the potential utility for employing the ILF or similar systems frameworks to analyze proposed public health action in its implementation phase. Carey and Crammond (9) turn their attention to major reports guiding a social determinants of health approach, coding recommendations against both the ILF and Meadows' 12 intervention points on which the ILF is based. Employing this systems lens leads the authors to the conclusion that *how* we intervene in systems can be significantly more important than *where* we intervene, due to the interactive contextual conditions that affect the effective implementation and uptake of proposed measures. This finding prompts the authors to interrogate taken for granted assumptions underlying the social determinants of health framework itself, which theorizes that upstream activity (i.e. changes to government structure and policy) present more powerful and effective intervention points than downstream measures (i.e. interventions targeting communities and individuals). Their work points to the utility of employing a systems lens to both support and interrogate the assumptions underlying dominant public health frameworks.

Other scholars have adapted and employed the ILF in novel ways that demonstrate its utility for fostering solution-based thinking. In her work designed to help nurse practitioners contribute to meaningful systems change, Butterfield (14) incorporates the ILF into her "upstream model for population health," expanding our 5 levels to 7. Butterfield's model stays close to ours in regards to paradigms, goals and system elements, but expands and tailors the levels specific to the dynamic interrelationships between system variables. By introducing nurses to a system framework tailored to their work experience, the author aims to help them identify opportunities for intervention, thereby moving "towards systems changes that are powerful enough to yield improvements" (14 p5). McIsaac et al. (7) employ a reduced

version of the ILF to code themes generated from their study of school food environments. They find that focusing on three condensed levels that capture the main areas of system function – its guiding visions and goals, interactivity between systems elements, and the systems elements themselves—to be sufficiently helpful in applying a complex systems lens to an area in which simple solutions are often proposed. The authors also suggest the approach moves them beyond a conceptual consideration of complexity, enabling them to unearth interactions within the school food system and identify specific points for intervention. Finally, Wittenborn et al. (15) employ the ILF in combination with a causal loop diagram (CLD) to interrogate the field of clinical research supporting marriage and family therapy. They suggest the ILF proves valuable for emphasizing the rules that govern a system as well as the players within it, thereby drawing attention to the need for change at both levels in order to produce meaningful and sustainable results. By employing the CLD and ILF to systematically consider barriers and strategies for increasing clinical research in their field, the authors are able to maintain a focus on the process for systems change and make specific recommendations, thereby avoiding "straying into a more general critique of the field" (15 p21).

Taken as a whole, the preceding examples provide evidence of the utility of the ILF as an adaptable tool for engaging scholars and practitioners in systems thinking, pushing users towards solution-oriented thinking, and moving them beyond conceptual consideration of complexity and towards concrete recommendations for system change. In regards to the future potential of the ILF, I envision it as being an accessible framework for furthering a WSA that accounts for linkages between various levels of activity within broader systems, thereby building upon socioecological approaches in public health and assisting public health practitioners and decision-makers with their planning, implementation and evaluative efforts. Research to support these efforts would ideally engage a wide range of stakeholders and embrace approaches similar to that of Van de Ven's (16) conceptualization of engaged scholarship, wherein academics work collaboratively with policy makers and practitioners to jointly address complex problems and identify pragmatic routes of action in complex policy landscapes.

Chapter 3: Cross-sector partnerships and public health: challenges and opportunities for addressing obesity and non-communicable diseases through engagement with the private sector

Since the time of our writing, the ongoing debate as to how public health might engage the private sector has been informed by several developments in the field. One of these is an emerging framing of some food and beverage producers as “unhealthy commodity industries,” a classification that suggests transnational producers of high-calorie, nutrient-poor foods and beverages belong in a class with tobacco, alcohol and gambling industries as purveyors of harmful products and predatory marketing practices (17). Similarly, the use of a “commercial determinants of health” frame shifts agency to industrial actors and links their outputs to population health outcomes in a manner that may also help guide decision-makers in their decision-making around collaborative engagement (17,18). Sugar-sweetened beverage (SSB) producers, for example, present an example of an unhealthy commodity industry that sponsors health promoting initiatives while also strategizing to counter proposed measure to curtail consumption of their products. Their efforts include spending an estimated $100 million in recent years to combat taxation efforts (19), and producing promotional material that downplays the impact of diet on physical health to instead divert attention to physical activity as a solution to the obesity epidemic (20). There is growing support in public health circles for market intervention measures—such as an SSB tax—as a means of shifting population behaviour. Such measures benefit from the development of clear policy narratives that build public support and leave them less vulnerable to hostile lobbying by opposing stakeholders (21). Partnership activities that muddy these narratives pose a broader risk to public health efforts; to this end, the arguments we present in Chapter 3 around the need to consider the broader interests of public health in relation to those of industry remain acutely relevant.

While public health may be coming to some sort of consensus on partnering with certain specific food and beverage producers, the complexity of the industrial food landscape continues to present difficult scenarios to public health researchers and policymakers. As noted previously, the consolidation of food and beverage companies under large multinational producers makes it difficult to draw clear lines around who is and who is not safe to engage with. Conversations in this area will also be further complicated by demands created by the global syndemic of obesity, malnutrition and climate change, the effects of which will demand coherent, wide-scale action by relevant

stakeholders (6). In our review we call for improved systems of monitoring and evaluation of industry activity as a means of supporting an engagement strategy with the food and beverage sector. Yach (22) expresses similar sentiments in a recent National Academies workshop on the role of business in multi-sector obesity solutions, suggesting that the issue of multi-sectoral collaboration is less one of trust but rather of verification. He calls on business to provide independently verified data, and more of it. There remains a persistent need for tracking global industry activity on a number of fronts, including predatory marketing towards children, lobbying efforts in response to proposed regulatory efforts, and measures taken to improve the nutritional quality of their products.

While evidence documenting industry activity presents one avenue to support decision-making regarding working with industry, the complexity of partnership practice with commercial interests suggests that more nuanced considerations of evidence be taken into account. Recent work conducted by Knai et al. (23) presents a promising systems thinking-based approach to producing evidence related inter-sectoral engagement. The authors revisit data produced from the evaluation of the UK's Public Health Responsibility Deal (RD), a public-private partnership built to produce voluntary self-regulatory agreements between government, industry, academia and non-profit organizations in areas related to areas of alcohol, food, physical activity and workplace health. With the aim of understanding why this approach produced little to no positive outcomes on public health, Knai et al. interrogate the data with an eye to causal pathways, structure and processes, feedback loops, and the resiliency of the wider systems the RD was aiming to improve. By viewing the RD as a system made up of interacting elements (or stakeholders) connected by feedback loops, the authors are able to identify specific ways in which the RD produced patterns of behaviour over time that favoured the interests of private sector partners. Their work provides a valuable addition to the ongoing dialogue about the practice of public health engagement with commercial partners, a dialogue that has been critiqued for relying too heavily on opinion over the provision of evidence (24). It also extends our conception of partnership evaluation beyond a focus on outcomes, and towards an understanding of how dynamic interactions form structural conditions that inform a wide range of consequences, both proximal (i.e. intervention outputs) and more distal (i.e. changes in the policy landscape).

In Chapter 3 we also touch upon depth of engagement and the organizational structures of multi-sectoral collaborative ventures as being key contextual factors in differentiating “partnership” from other activities—ideas further explored in Chapter 4. Dickinson and Glasby (25) suggest that the term partnership has positive moral associations—of “mother love and apple pie”—that preclude a critical analysis of, and reduce resistance to, efforts that are in practice market-based relationships or too hierarchical to be considered trust-based partnerships. In their recent literature review of researcher engagement with industry, Cullerton et al. (24) note that few documents recognize the diversity of types of interactions and whether different strategies regarding conflict of interest and risk assessment might be required for them. The application of approaches such as that developed by Knai et al. could further the development of a typology to assist in these matters. Austin and Seitanidi’s (26) collaboration value framework—referenced in Chapter 4—would also be a worthy addition to public health’s box of tools for thinking through activity in this area, and could likely be combined with the ILF in a manner similar to the way in which we combined Austin’s collaboration continuum framework and the ILF in Chapter 3. Public health’s ongoing dialogue on partnership should also ideally be rooted in a transparent honesty regarding the value of various types of partnership engagement, which in turn requires a commitment to learning from experimentation in this area. I feel that the work we conducted in Chapter 4 provides one such example of this effort.

Chapter 4: Developing co-funded multi-sectoral partnerships for chronic disease prevention: a qualitative inquiry into federal government public health staff experience

My third and final research chapter represents a qualitative exploration of Agency staff’s experiences and a documentation of their tacit knowledge regarding MSP development in a co-funding context. I propose that the methods we adopted align well with the systems science approach, and for producing the type of evidence needed to support an informed WSA. In our case, this evidence is generated not from the final outcomes of MSP program—its funded interventions—but rather from an accounting of the effects of introducing a new program approach to affected stakeholders. Our approach is therefore similar to Hawe et al.’s (8) proposal that we theorize interventions as events in systems, applied in this case to programs and policies, such that we might account for the manner in which interventions interact with local contexts and produce unintended effects. Adapting the coding paradigm developed by Strauss and Corbin (27)

proved to be useful in this regard as a means of depicting processes set amongst specific conditions. While a main limitation of our study in moving towards Hawe et al.'s approach was our inability to identify and document these effects from outside of the perspectives of Agency staff, our findings lay groundwork for thinking about the MSP program in terms of its effects beyond the interventions funded by the program, and to consider its systemic impacts. An obvious complementary piece to our study would be to interview private and NPO stakeholders about their experiences in order to surface their perspectives and compare them to those of Agency staff. From a systems perspective, lines of inquiry from this study would extend to what participants perceive to be the benefits and costs of participating in the MSP program, including factors such as the displacement of regular organizational activities in favour or program participation and the transferability of the capacities gained through the proposal process to other contexts.

Scholars have suggested that we already have ample descriptive evidence regarding partnership development, and that more focus should be turned towards examining partnership outcomes as a means of evaluating their work (28). I agree with this statement to the extent that we have a strong body of partnership literature that documents the basics of collaborative dynamics, as we summarized in Chapter 3. However, as indicated in the previous section, the generic application of the term "partnership" across the literature to describe varied collaborative structures give a false sense of strength to our understanding of partnerships and their function. An alternate perspective on this might be to suggest that co-funding models such as that studied here not be classified in the same body of study as other partnership ventures. This debate is beyond the scope of my work, but poses interesting questions for moving forward. For the purposes of our study I will argue that, for as long as "partnership" continues to be employed in such varied contexts, explorations that consider the ways in which contextual conditions impact the collaborative process are still valuable. One way in which we contributed to this task was by introducing the term "co-funded" into our descriptions of the program as a means of making its structure more evident, a decision that emerged when we realized that the co-funding aspect of the program was fundamental to understanding how common partnership themes of trust, alignment of interests and capacity played out.

5.2. Reflection on learnings and contributions

In reflecting on my work as a whole and considering the lessons learned therein, I find myself returning to the central role that trust plays throughout systems—in regards to all manners of interactions between individuals and organizations. We know from the literature, and from our own experience, that trust is essential and complex—dynamic, evolving, shifting between affect- and cognitive-based, and informed by the context and needs of the situation at hand. Taken from a perspective that employs the ILF as an organizing framework, we can scale trust on a continuum of complexity from the lower levels of system activity to its guiding paradigms. At the lowest of level of system function, trust can be viewed as grounded in individual and organizational capacities—both material and psychosocial. These resources form the building blocks for the engagements in which trust is co-developed through individual and organizational interactions. Solomon and Flores (29) point to goal of *authentic* trust—i.e. trust that is mature, articulated, and continuously cultivated. While the work that takes place at lower levels of system function provides the building blocks through which authentic trust may be attained, our findings in Chapter 4 reinforce that it is the work conducted at a system's highest levels—those of goals and paradigms—that may ultimately determine its achievability. As suggested in Rittel and Webber's (30) classic conceptualization of wicked problems, the ability to identify a shared narrative and problem definition form the core of addressing complex problems. The ability to do so—where it is possible—may ultimately be reliant on the formation of an authentic trust that enables system actors to work beyond sectoral boundaries and identify productive strategies that are perceived to be viable and worthy to all relevant parties. The implications across public health practice—be it in regards to policy, planning or multi-sectoral engagement—have already been noted by a wealth of scholars and practitioners. Among them is the need for meaningful engagement with relevant system actors, including those frequently marginalized from these discussions but who are often most affected by their outcomes. This work is complex and time consuming, but necessary to reach the level of authentic trust that can help system actors overcome traditional barriers and move towards solutions.

Methodologically speaking, the work in this dissertation contributes to the broader task of applying a systems lens to complex public health problems. Chapter 2

suggests the utility of the ILF as a means of benchmarking systems approaches in planning for complex problems, and as a heuristic to guide decision-making regarding policy and program activities. The work conducted by others since the time of that chapter's publication has further demonstrated the adaptability and accessibility of the ILF, and points to exciting potential future uses. While the methods employed in Chapter 4 do not directly employ systems science, they represent efforts to engage with complexity through the application of existing qualitative methods. By adapting the coding paradigm and pushing it towards a consideration of feedback mechanisms, we were able to move beyond a descriptive account of the phenomena on under study and indicate potential for adaptive learning in response to lessons learned through the surfacing of practitioner tacit knowledge.

5.3. Considerations for moving forward

In Chapter 1, I reviewed Glouberman and Zimmerman's (31) distinction between simple, complicated and complex problems. While the authors lay out a number of criteria that make complex problems unique, they suggest they have one thing in common with the other categories—the possibility of addressing them with an "optimistic approach." It is in this spirit of optimism that I wrap up my inquiry into the roles that systems thinking and partnership might play in furthering the public health project of shifting systems towards healthier outcomes. I do this through two avenues—first by stepping back to take a systems view of public health itself, and secondly by considering systems science approaches for supporting public health in moving forward.

5.3.1. Supporting a paradigm shift towards the WSA

Experts suggest that, in spite of the presence of socioecological and systems frames in the public health literature, efforts to address complex problems still skew towards individual-level responses (32). These efforts are worthwhile but have their limitations. The suggestion that we frame public health activities from a whole systems perspective represents a paradigm shift, which in turn raises questions regarding the goals public health might want to pursue in its support. As Meadows (11) notes, a system's paradigm is often less explicitly stated than it is manifest by the actions of its stakeholders, particularly with those who hold its power. There are no easy answers as

to which goals and paradigm(s) should gain precedence in guiding public health policy under a WSA; rather, the issue presents an ongoing, reflective exercise for the field. This includes a thoughtful assessment of which indicators are employed to assess population health, and to what ends. It also necessitates the continued pursuit of effective strategies to implement adaptive policy making approaches and improved knowledge transfer throughout systems. Martin et al. (33) note that public health systems are in and of themselves complex adaptive systems that have suffered infrastructure losses worldwide—a fact that presents a significant challenge for the field in moving forward with these approaches.

Public health's engagement with the private sector also poses questions about its goals and guiding vision. We have already reviewed the potential risks of engagement with certain private sector partners, including a dilution of the public service responsibility, damage to public health's reputation and allowing the private sector access to policy-makers and public health agendas. Another aspect of the blurring between the public and private roles is the increasing reliance on market-driven solutions by public health (34). While not studied in this context, the MSP Initiative that was the focus of Chapter 4 serves as one example of a public health agency program influenced by an innovation focus normally associated with the private sector. One of the program's funded products—a mobile app that aimed to improve users' fitness by rewarding them with loyalty points bought from third parties and sold to the federal government at a markup—recently shut down in spite of having more than a million users, having failed to find a private purchaser (35). While a full description of the reasons for the app's closure are beyond the scope of this discussion, it serves as a useful example for grounding pertinent questions. When we speak of the need for government to "innovate" and "take risks," is this what we mean? Should government try and make its way into landscapes already populated with private sector efforts? How do these efforts affect public health's brand, if at all? And, more broadly, how do efforts such as these align with the call to engage in inter-sectoral collaboration to affect systems change? I raise these questions not to critique the program based on this one example, but to situate it and other models of inter-sectoral engagement within this broader discussion regarding public health's role in going forward. In Teutsch and Fielding's (36) call for public health to "rediscover" its core values and practices, the authors address the challenges facing the field in light of lowered levels of trust in

government and public health struggling to get its messages across in an increasingly fragmented media landscape. This fragmentation has only intensified and the time may be nigh for public health to position, or reposition, itself in terms of its unique capacities and distinct vision, and evaluate which goals and inter-sectoral collaborative activities serve to further its agenda.

5.3.2. Furthering the application of systems science methods to support a WSA

While significant progress has been made, concerns still exist about the need to bridge the gap between theory and practice for implementing and analyzing public health events from a whole systems perspective. Recent years have seen exciting advances in the application of systems science methods for a variety of purposes. Brown et al. (37), for example, applied “interactive systems thinking methods” to the study of peer-led programs for HIV and hepatitis C, with the aim of developing a framework for monitoring and evaluation that could be applied to programs in different contexts. Their efforts represent one example of applying a systems lens and incorporating—rather than controlling for—the complexity of interventions. Another exciting advance in the application of systems science methods has been the use of group model building (GMB) to engage stakeholders. In addition to the model outputs created from this process, GMB offers the benefit of bringing stakeholders together to develop joint definitions of problems and define the boundaries of their associated systems. As such, it has the potential to create alignment between stakeholders, promote buy-in for proposed policies, and provide decision-makers with a sense of ownership over a problem and its proposed solutions (38,39). I envision GMB might also be helpful in identifying shared process-based goals for health promoting activities. The development of these “functional targets” are difficult to identify in practice and would likely benefit from stakeholder dialogue in order to determine their feasibility (40).

Several scholars point to value of pairing system science methods and outputs with relevant social science theories and frameworks. Butterfield (14) argues that activities that are “conceptually grounded” are more likely to achieve their intended consequences, in part because the majority of population-focused theories “pay heed to the important messiness of context and the use of power” (14 p9) Salway and Green (41) advocate for a critical complex systems approach that recognizes structure as a

source of power and harnesses the insights of decades of social and political science on the subject. They also express their concern at the perceived marginalization of critical scholarship and community voices in the field of systems thinking to date, and call for the integration of social and political theory with systems approaches. Their work echoes that of Jackson's (42) development of critical systems theory as a response to soft systems theory's lack of formal commitment to a social justice reading of events in systems. These works seek to steer the evolution of systems science away from functionalist applications for system improvement, and towards an application informed by clear understanding of *what* is trying to be improved, for *whom*, and with *what* consequences.

An important task facing systems thinkers is that of overcoming public health's perception of the field itself, which is seen by some practitioners as over intellectualizing common sense ideas to the point of confusion (43). Carey et al. also critique the systems sciences for presenting itself as a "new way forward," suggesting instead that the field should think of itself instead as an "additional set of methods to organise and analyse information about complex and dynamic public health phenomena" (44, p6) that can sit alongside other public health approaches. Regardless of one's position on this matter, systems thinkers should take seriously the task of facilitating the translation of their methods to public health decision-makers and practitioners in the face of resistance and skepticism. A key means of furthering the application of systems science for public health problems may be putting those approaches into the hands of practitioners themselves. Erwin et al. (45) have identified systems thinking and systems methods as one of five key capacities future public health leaders will need. They also suggest that the ability to identify and analyze policy changes and their impact in the context of uncertainty will be one of the most important skills for future public health practitioners, a task for which systems science is well suited. Embedding systems thinking throughout public health systems themselves may hold tremendous potential for generating the mass of small scale changes that can lead to greater emergent effects. Fulfilling this promise will require a thoughtful consideration of what aspects of systems science should be standard practice for public health agents, and what we mean by systems science "practice" itself in the context of public health working. I echo Peters' suggestion that that the question is less about whether or not we should use systems thinking, but rather, "which of the many theories, methods, and tools currently associated with the

field of systems thinking are most useful in particular settings" (46, p2) As stated in Chapter 1, soft systems approaches pose an accessible and useful tool for public health, and the project of making these methods more accessible for a wider range of stakeholders is an exciting one. Sallis' (47) evaluation of Alberta's Healthy Kids, Healthy Communities project presents some hopeful findings in this regard. In asking the question as to whether or not it was feasible to translate the "mainly academic" exercise of GMB to community groups representing 600 individuals from diverse backgrounds, the author's conclusion was yes—it was. Results such as these cast a hopeful light on the potential future for systems science in public health practice and its potential value in shifting systems through shifting mindsets.

5.4. Conclusions

> We know a tremendous amount about how the world works, but not nearly enough. Our knowledge is amazing; our ignorance even more so. We can improve our understanding, but we can't make it perfect. *(Donella Meadows)*
>
> I never knew anybody . . . who found life simple. I think a life or a time looks simple when you leave out the details. *(Ursula K. Le Guin)*

Obesity and NCDs are a significant set of complex problems facing public health in the 21st Century. While no single approach to addressing them will prove to be a panacea, a whole systems lens has the potential to shift our perspective towards a stronger understanding of the dynamic interrelationships that affect our efforts to address them. Systems thinking and science have, in turn, presented a range of options for supporting these efforts, and the past decades have witnessed exciting advancements in drawing then into mainstream public health research and practice. Another branch of obesity and NCD prevention has focused largely on the inter-sectoral relationships assumed to be necessary components of a whole systems response to these conditions. Viewing these activities through a whole systems lens can help public health stakeholders better consider their implications. The research and reflections presented in this dissertation represent my efforts to engage with these subjects thoughtfully and with an eye to the broader issues related to pursuing particular approaches to obesity and NCD prevention. Considerable work remains to be done in

this area; indeed, the exercise of determining which approaches might help to address the complex problems facing public health is a continuous one of experimentation, learning and revision.

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Appendix A.

Chapter 4 Methodology and Methods Supplement

The purpose of this supplement is to provide a more detailed account of the methods described in the data analysis section of Chapter 4 (section 4.2.2; p68) and the methodological approaches in which they are grounded.

Overview

The aim of this study was to surface and document practitioner experience regarding their multi-sectoral partnership work, which was in turn conducted in the context of a new and evolving Public Health Agency of Canada program. Our study design was therefore informed by Ambrosini and Bowman's (1) methodology for studying tacit knowledge—i.e. knowledge that is held by individuals and can be difficult to formalize and pass on to others. The authors' approach is grounded in a social constructivist position that considers the source of meaning to be the subjective experience of individuals—their interpretation of events, their engagement with their surrounding environment, and their interactions with other. As such, Ambrosini and Bowman's approach aims to elicit individuals' understanding of their work experience and the mental models that guide their practice. Ambrosini and Bowman's full approach uses initial narrative interviews to elicit themes with which to begin causal mapping sessions with study participants. However, limitations of the research study site (namely, time restraints and lack of access to teleconferencing support) prompted us to modify the authors' suggested methods and conduct traditional focus group sessions that followed up on themes emerging from our first round of interviews. For the second phase of data analysis we sought to explore relationships between the data through another method—the coding paradigm technique developed by Strauss and Corbin (2) as part of their grounded theory methodology. In the following sections I describe the methods employed during the two phases of our data analysis in more detail.

Data Analysis—Phase 1:

I was responsible for conducting our initial thematic analysis on individual interviews and the follow-up focus group transcripts. I began this process by reading the full interview transcripts and making initial observations in order to familiarize myself with

the data set. I conducted open coding by affixing short, descriptive codes to meaningful chunks of data, be they a significant two-word phrase or metaphor, or a sequence in which a participant described a significant event or feeling in several sentences. Initial codes stayed close to the data and were descriptive. As recurring themes emerged, higher level codes were developed. Through an iterative process of cleaning and reviewing my codes in NVivo I continuously integrated previously coded material into higher level themes, constantly refining my theme descriptions. I sought to achieve a stated objective of thematic analysis by developing themes that were internally consistent, mutually exclusive and comprehensive (3, 4). While I was sensitized to certain concepts through my knowledge of multi-sectoral partnership development and public health practice, I endeavored to code as inductively as possible. As such I avoided turning to literature during this phase, other than to clarify definitions of words and concepts to ensure my codes were accurate representing the meanings found in the data. Throughout this process I engaged in reflective journaling to identify and question my assumptions and biases, and to document my challenges with the coding process and data set. I also wrote memos—informed analytic notes—to document my thought processes and decision-making regarding codes and themes, and to capture preliminary thoughts about higher order meaning present in the data. My collaborator contributed through this phase by reviewing and coding selections from the data set such that we could compare my approach to her interpretations of the data.

Data Analysis—Phase 2:

For the second round of data analysis we reconsidered our themes in relation to the categories presented by the coding paradigm. Through an iterative process my colleague and I discussed Strauss and Corbin's original design and categories in relation to our data set and study purpose, which differed from the purposes of grounded theory methodology. Whereas grounded theory is intended to help the researcher develop theory around a specific phenomenon, we did not set out to develop theory around the diverse range of experiences shared by study participants. As such we adapted the coding paradigm to the needs of our study. We maintained the step of identifying a core category—a category (or theme) that appears frequently and is connected to other major categories. This was a time-consuming process consisting of constantly comparing a potential core category to other key themes in the data to determine if said category linked to our other findings and served to capture the essence of our data set in a

comprehensive manner. Once our core category (experiencing uncertainty) was identified, we revisited our findings to identify themes related to the other coding paradigm categories, some of which we changed from Strauss and Corbin's original wording, our aim being to make our model more relevant to our data set and more accessible to our audience (public health practitioners and policymakers). We identified *strategies* (changed from *actions/interactions)* and *outcomes* (changed from *consequences*), and developed two layers of contextual conditions that informed each case of partnership development occurring within the program under study. We removed the category of *causal conditions* as our model was intended to capture the general experiences of study participants at broader level than is usually the focus of a grounded theory approach aimed at understanding specific events and the decision-making individuals make in response to them. We did not identify direct linkages between our contextual conditions and core category for the same reason.

Our process of developing and refining our model through this process of axial coding was highly iterative and supported through memo-writing, constantly comparing our emerging model to our original data, peer debriefing with myself and my collaborator, and the writing process. Efforts were made to meet Lincoln and Guba's (5) criteria for internal validity (or credibility) and establish the trustworthiness of our study. Our focus group sessions and a presentation of initial findings served to act as a member checking opportunities to assess the resonance of our findings with study participants. We engaged in audience review by presenting versions of our work at conferences and soliciting feedback from peers in the field. Due to her level of expertise in conducting qualitative analysis and grounded theory, my research collaborator on this project was able to perform the task of peer debriefing by challenging my decision-making throughout the axial coding process. We have also presented our results in a format that privileges the voices of study participants by including them in-text, thereby endeavoring to clearly link their experiences to our interpretations of the data.

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Appendix B.

Chapter 4 Data Supplement

Table B.1. Coding paradigm category development

Paradigm	Category	Subcategory
Experiencing uncertainty	Uncertainty related to program novelty	• Risks and opportunities of navigating new content areas and networks • Matched funding requirement introduces challenges • Novelty of working with private sector • Open and flexible work environment introduces new challenges and opportunities
	Uncertainty related to staff and partner roles	• Staff struggle with partner/funder identity • Staff question applicants' engagement in process • Agency role changes with co-funding partners
	Uncertainty related to partner and staff capacity	• Applicants struggle with program requirements and complexity • Gaps in staff capacities to work with new program elements
Strategies for responding to uncertainty	Clarifying partner interests	• Surface motivations and assess "goodness of fit"
	Building trust in relationships	• Clear, transparent and adaptable communication strategies • Acknowledge and equalize power dynamics and risk differentials
	Supporting capacity development	• Providing knowledge and expertise (process and policy landscapes) to applicants • Accessing knowledge and training for Division staff • Strong internal culture of learning and exchange facilitate capacity development
Partnership-level outcomes	Deepened inter-sectoral understanding	• Value of deeper levels of collaboration • Private sector learning how government works • Increased appreciation for NPO capacities
	Impacts on trust	• Trust broken or damaged • Trust built and/or strengthened
Program-level outcomes	Program refinements	• Narrowing criteria for application acceptability • Evolution and adaptation of processes over time
	Increased internal capacity	• Personal growth and learning • Division internalizing expertise
Program-level context	Mandates (innovation and sustainability)	• Introduction of new, upstream, content areas • Introduction of private partners/matched funding
	Proposal complexity and requirements	• Difficult technical requirements of process • Length of time and investment required

Partnership-level context	Depth of collaboration	• Variation in staff role in intervention development • Variation in levels of engagement between all partners on case files
	Partner attributes	• Heterogeneity of individuals and organizations on case files

Table B.2. Select subcategory development

Subcategories	Concepts
Risks and opportunities of navigating new content areas and networks	• Agency interferes in established networks ("potential minefields") • Trust not naturally built in forced marriages • Excitement of exploring new content areas (ex. built environment)
Matched funding requirement introduces new challenges	• Applicants have difficulty procuring matched funding • Difficulty of waiting for applicant to secure matched funding (limbo)
Novelty of working with private sector	• Inter-sectoral differences with private sector (communication, process, motives) • Determining private partner suitability • Lack of experience working with private sector • Heterogeneity of private partners
Open and flexible work environment introduces new challenges and opportunities	• Constant scoping for emerging opportunities • Increased difficulty of decision-making • Staff need increased comfort with level of risk • "Working in the greys" • Room for thinking creatively and outside the box • "Permissive" culture in Division • Open timelines for development introduce uncertainty • Novel working environment for federal government
Staff struggle with partner/funder identity	• Balancing between guiding and directing applicants • Participants' self-correct language around directing/helping participants • Difficult to think of Agency as partner (public funding) • Agency has final decision-making authority (power imbalance)
Staff question applicants' engagement in process	• Applicants not willing or able to respond to proposal feedback • "Getting it" • Difficulty shifting applicant away from "pet" project ideas • Organizations over-promise
Agency role changes with co-funding partners	• Power shifts to bigger funding partner • Co-funding partner has less to lose

Applicants struggle with program requirements and complexity	• Applicants can't demonstrate measurable outcomes or evaluation plan • Applicants can't understand pay-for-performance model • Applicant can't convert intervention idea into full proposal • Applicant worn down by back and forth negotiation • Inter-sectoral (private sector) differences re. measurement and data
Gaps in staff capacities to work with new program elements	• Government lacking skills to work with private sector • Staff missing content expertise • Needs arising in response to new content areas and projects
Surface motivations and assess "goodness of fit"	• Identifying common interests or shared value • Surface private sector motivations beyond CSR • Identify shared needs re. data and measurement
Clear, transparent and adaptable communication strategies	• "Care and feeding" of relationships a priority • Navigating bilateral conversations • Variable need for communication with third-party partners • Lots of informal discussion • Tailoring approach based on partnership needs • Need for honesty and transparency in communication • Communication strategy: not overpromising
Acknowledge and equalize power dynamics and risk differentials	• Clearly convey risks of participation • Communicate value of all partner roles (including non-funder) • Risk to employment for individuals in NPOs • Feelings of responsibility towards applicants • Implementation partners essential
Providing knowledge and expertise (process and policy landscapes) to applicants	• Capacity building re. government relations • Building applicant capacity to work with process • High capacity in applicant eases process • Linking applicants with evaluators/academics
Accessing knowledge and training for Division staff	• Staff receive brokering training • Staff present brokering training internally • Division contracts third party data experts
Strong internal culture of learning and exchange facilitate capacity development	• Strength of mix G&C and policy staff on case files • Strength of informal communication and knowledge exchange within Division • Strong trust within Division