Maritt Kirst · Nicole Schaefer-McDaniel
Stephen Hwang · Patricia O'Campo *Editors*

Converging Disciplines

A Transdisciplinary Research Approach to Urban Health Problems

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Foreword by Patricia Rosenfield and Frank Kessel

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Foreword

> The year 2007 was a turning point in human history as it saw half of humanity already living in towns and cities. By 2030, three-quarters of the world's population is projected to be urban.
>
> *Anna Tibaijuka, Under-Secretary-General of the United Nations and Executive Director of UN-Habitat, 2009.*

> Knowledge seeps through institutions and structures like water through the pores of the membrane. Knowledge seeps in both directions, from science to society and from society to science. It seeps through institutions and from academia to and from the outside world. Transdisciplinarity is therefore about transgressing boundaries.
>
> *Helga Nowotny, 2004.*

The helter-skelter nature of urbanization, characterized by unpredictable inflows of migrants from rural and suburban areas as well as war zones, the patchwork quilt of services and systems with most not reaching low-income, marginal populations and often inefficient governance mechanisms ... all these concatenating factors make urban planning a vitally important area for research and action (Ash, Jasny, Roberts, Stone, & Sugden, 2008). As a positive corollary, urbanization should also serve as a space for innovative researchers, policy makers, practitioners, and communities to collaborate in creating workable and livable cities. While many negative dimensions of urban life – especially, crime, unemployment, poor education – are grist for the popular media mill and urban despair, the dimension of life that arguably detracts most from a viable urban fabric is human health. In the past, the black plague and outbreaks of cholera made cities high-risk environments. Today, as amply detailed in this comprehensive collection, a challenging range of direct and indirect health problems permeates urban life.

The distinctive nature of this book is that the chapters are woven together by the theme of transdisciplinary (TD) research as applied to the problems of urban public health. The authors of all the chapters analyze how to initiate and conduct TD research and apply results utilizing this new frame. The TD research approach, carefully defined in the first part of the volume, places issues of urban health at the center of its focus and brings an appropriately wide range of perspectives and expertise to bear on the goal of understanding the underlying causes, consequences,

and solutions to key problems. In essence, on the assumption that complex health and social problems demand integrated analyses and solutions, TD research is an approach that draws together concepts and methods from a wide range of fields**.** As the editors state in Chapter 1, "It is necessary for researchers to work with experts of other disciplines in other areas of knowledge, and together, move beyond disciplinary perspectives, methodologies, theories, boundaries, and limitations to understand these complex urban health problems more fully and attempt to resolve them."

A related, now widespread conclusion and concern is that, while supporting and drawing on largely separate disciplines is more manageable (i.e., outcomes are more readily defined, measured, and evaluated), such a linear approach has often led to ineffectively implemented and poorly sustained solutions (Rosenfield, 1992). Hence the importance of the studies in this volume that demonstrate, through a variety of illustrations and applications, how a TD approach "is advantageous for increased understanding of complex health problems emergent in urban settings" (O'Campo et al., Chapter 1). Such applications build on the recognition that integrated input from many different disciplines, including those with an understanding of health systems, community preferences, politics, and economics, is needed to achieve results that are both used and useful, as Chesney and Coates (2008), for example, have found by designing and systematically applying multi-level, integrated analyses to the problem of HIV/AIDS in San Francisco.[1]

As Nowotny, a pre-eminent European social scientist who has written extensively on this topic, declared in 2004, "Transdisciplinarity is a theme which resurfaces time and again." And yet, while such a research paradigm is the focus of much recent discussion, it is still not fully accepted as a viable approach for complex social problem-solving . . . neither by practitioners, policy-makers, or funders, or even by many researchers. Under such circumstances, and particularly through its presentation of a wide range of carefully analyzed case studies, this collection is a welcome and vibrant contribution to the process of illuminating the use and the value of TD research. In addition, the chapters in Part IV not only assess the opportunities and challenges of such an approach but also provide practical recommendations on how to extend the use of TD research in addressing apparently intractable urban health problems.

Converging Disciplines: A Transdisciplinary Research Approach to Urban Health Problems thus augments the emerging, albeit still limited, literature on the application of TD research. Through detailed assessment of the value of TD approaches applied to issues ranging from intimate partner violence, child injury, substance abuse, and harm reduction to homeless adults and refugees, the authors demonstrate the feasibility and value of multilayered studies in complex settings. As important, such studies are developed by teams drawn not only from relevant

[1] Although Chesney et al. refer to the work of the Center for AIDS Prevention Studies (CAPS) as "multidisciplinary," we have suggested (Kessel & Rosenfield, 2008b, p. S230) that the potential for it to become truly and importantly transdisciplinary is embedded in all of its projects and successes, which now extend well beyond San Francisco (see the postscript in Chesney & Coates, 2008).

disciplines, but also from practitioners and community members themselves. This volume thus contributes in a fine-grained manner to furthering our understanding of both the application of TD research and the related development of team science.

In so doing, this book significantly extends the findings and recommendations of three directly related publications. As noted in Chapter 1, the collection amplifies conclusions drawn from a series of case studies, presented in Kessel, Rosenfield, and Anderson (2008), that describe and analyze the creative work of interdisciplinary teams encompassing a range of health and social sciences.[2] A second publication on "The Science of Team Science: Assessing the Value of Transdisciplinary Research," edited by Stokols, Hall, Taylor, Moser, and Syme (2008), addresses basic concepts, methods, assessment, and training, as well as specific instances of team science in the study of tobacco-harm reduction and cancer. Finally, building on the burgeoning European movement in transdisciplinarity, the *Handbook of Transdisciplinary Research* edited by Hadorn et al. was also published in 2008. Like the innovative material presented here and in the other two collections, the *Handbook* presents a series of studies, ranging from river basins to nanotechnology, as the basis for critiquing and developing a TD research approach.

So the question arises: Given the increasing volume of research adopting a TD framework, why has it been a challenge for it to achieve recognition as an accepted approach to examine and address complex problems? Based on various analyses of case studies of interdisciplinary and TD research, we believe that, beyond those inherent in establishing collaboration that crosses discipline and departmental lines, key constraints revolve around the challenges in training and concomitant university support, the difficulty of achieving success in sustained funding, and the limited availability of publication opportunities (Kessel & Rosenfield, 2005, 2008b; Stokols et al., 2008). Such challenges are also noted in many of the case studies presented in this volume. And the fourth part provides detailed analyses of advances in such research, the need for sustained funding, and the appropriate training programs, along with the need for innovative approaches in assessing TD research's value and, as a corollary, its value added.

Considering this book's thoughtful presentations of the challenges and results of TD research, we suggest that two major features could significantly enhance the acceptability and applicability of such an approach, particularly around the cluster of urban health problems that are increasingly prevalent in the twenty-first century. The first such feature, and significant value added, is demonstrated by the multiple ways in which Kirst and her colleagues have incorporated practitioners and users into their research teams. Analogous to the development of translational research in biomedical research fields, where practitioners are brought into the process or, as a minimum, the possible application of the intervention is actively considered from the outset, this expansion of teams should greatly enhance the acceptability and use of research results by health and other service providers, as well as decision makers

[2]The original edition, published in 2003, was titled, *Expanding the Boundaries of Health and Social Science: Case Studies in Interdisciplinary Innovation*.

(Andrews et al., 2009; Contopoulos-Ionnaidis, Alexiou, Gouvias, Ioannidis, 2008; Kaiser, 2009).

That said, given the appropriate involvement of a multiplicity of disciplines and methods, the language for communicating research results and, indeed, the nature of the research process itself to both the public and the decision makers requires reflective, self-critical attention. An especially intriguing discussion of this process of knowledge translation (KT) is presented in this volume by Murphy, Wolfus, and Lofters (Chapter 9). Using the framework of a Socratic dialogue, they discuss the problems that emerge when "transdisciplinarity is presented as a collaborative research strategy that essentially ends when KT begins". What can be missed here is that the TD research approach and TD teams also open up important opportunities for promoting "praxis"; or, the integration of inquiry and action to advance social change (see Chapter 9). Murphy et al. discuss how the KT framework can extend the process of interdisciplinary research and bring about greater collaboration of the researchers with communities, practitioners, and policy makers. In this context, it is worth noting how several authors have recently underscored an ever-present risk of communicating research in too simple a fashion so that the complexity of a proposed solution is unclear, perhaps even misleading. More positively put, given the increasing emphasis on building bridges between researchers, policy makers, and practitioners, as well as with community members who have a central stake in obtaining solutions to problems, it is likely that such risks will be minimized (Alberts, 2008; Downs, 2000; Klein, 2004).

The second feature that we believe could significantly enhance the acceptability and applicability of a TD research approach relates to the institutional structure of the research framework itself. As elaborated by Kirst and her colleagues in Chapter 12, TD research can seem unwieldy, complicated, and costly in terms of time and money. It also involves a considerable commitment to the collaborative process itself, sometimes only indirectly related to the substantive form and focus of the research. In addition, echoing other analyses, Kirst et al. highlight the investment required in learning other disciplines' languages and the related need to listen to a wide range of voices and perspectives.

With those challenges in mind and seeking to facilitate the conduct of TD research – notably on the complex, multi-faceted problems of urban public health – so that the enterprise becomes at once less daunting and more manageable *and* more systematic, we would like to mention three innovative analytical approaches. First, there is the ecologically oriented work of Stokols and his colleagues, both in this volume (Chapters 8 and 10) and elsewhere, aimed at articulating and instantiating "the science of transdisciplinary action research" (Stokols, 2006). Second, there are the efforts of Cacioppo, Davidson, Seeman, and others that represent significant strides toward a theoretically sophisticated and empirically grounded framework that bridges and, indeed, blends the neuro-biological, psychological, and socio-cultural dimensions of health (Berntson & Cacioppo, 2008; Davidson, 2008; Seeman, 2008).

Finally, stimulated by Berntson and Cacioppo and others, in our own writings we have been exploring the concept of *heterarchy*. Originally developed in computer

and cognitive science and now extended in a number of fields (e.g., Crumley, 2005), this concept provides a framework for understanding the kinds of reciprocal, multi-level, and non-linear phenomena that are a central focus of TD research approaches. In our view, heterarchy is a heuristically rich way to organize the complexity required for analyzing and addressing deep-seated social problems. Moreover, and as we have noted elsewhere (Kessel & Rosenfield, 2008a, 2008b), heterarchy has great potential not only as an analytical lens but also as a way of conceptualizing the non-hierarchical organization of TD teams and related institutional structures. We therefore suggest that the next phase for the expansion of TD research on urban health problems be organized, in part, around a heterarchical framework.

Whatever specific next steps are taken in the development of TD research on urban health problems, the penetrating analyses in this publication will serve as a firm foundation for future efforts. If only, but not only, because of the wide range of urban public health problems addressed, these chapters provide the basis for practitioners, community members, and researchers to collaborate creatively to help ensure that the two-thirds of humanity who will be urban citizens in the twenty-first century will lead healthier and hence more fulfilling lives.

Patricia Rosenfield
Frank Kessel

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Raffi Balian has been a harm reduction outreach coordinator for over 10 years. He developed and currently coordinates the COUNTERfit harm reduction program at the South Riverdale Community Health Centre in Toronto. Mr. Balian has had work on harm reduction programming and research published in several local, national, and international journals, magazines and periodicals, and his identity as an active injection drug user has been instrumental in the development of programs that respond to the needs of illicit drug users in Toronto and elsewhere.

Jennifer Butters is an affiliate scientist with the Centre for Addiction and Mental Health. Her primary research interests focus on the intersection of drug use, violence, and mental health among youths. She has served as a co-investigator on several research projects and participates in the graduate collaborative program in addiction studies [CoPAS] at the University of Toronto.

Betty Campbell has lived in Corkerhill since 1974 and played a pivotal part in the work described in Chapter 6. She was active in the Corkerhill Community Council, campaigning for improved housing, safer roads, and play parks. She set up and ran a "Danger Watch" group which turned the safety problem on its head with children identifying and reporting dangers rather than being told how to keep themselves safe.

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Part I
An Introduction to Transdisciplinary Research

Chapter 1
Introducing a Transdisciplinary Approach to Applied Urban Health Research

Patricia O'Campo, Maritt Kirst, Nicole Schaefer-McDaniel, and Stephen Hwang

In the context of increased urbanization in the last century, public health research has evolved to explore the impact of urban environments on health (Galea & Vlahov, 2005). This relatively new body of research is referred to as urban health research and it seeks to explore determinants and outcomes of health as well as the interrelationships between them (Harpham, 2008). City living can affect health in multiple ways. Specifically, health in the urban context can be affected by such factors as the physical environment, the social environment, and access to health and social services (Galea & Vlahov, 2005). In the past, health research has primarily examined the influence of individual characteristics on health. However, given the effects of multiple factors on health in the urban context, an understanding of the complexity of health problems in the urban environment is beyond the boundaries of any one discipline, thus the involvement of multiple disciplines and sectors and various research methods is required (Galea & Vlahov, 2005; Harpham, 2008). As a result, urban health research has evolved to encompass a variety of methods and perspectives to study these complex health problems.

As we and our contributors will be discussing throughout this book, it is necessary for researchers to work with experts of other disciplines and areas of knowledge, and together move beyond disciplinary perspectives, methodologies, theories, boundaries, and limitations to understand these complex urban health problems more fully and attempt to resolve them.

Current State of Urban Health Research

Urban health is not a mature field, but is constantly evolving. For example, urban health studies can include the examination of the urbanization process, of health status and behaviours among populations in the developing world, of slum and inner-city populations and issues, and/or of the health of socio-economically marginalized

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and disadvantaged populations. A common thread among these agendas is a focus on the study of how poverty as well as attributes of the social and physical environment and access to services (e.g. health, social) affect complex social/health issues. Moreover, all of these undertakings emphasize the need to link research to action. For example, The World Health Organization Knowledge Network on Urban Health Settings (WHO KNUS) has recently made a call for research concerning a number of pressing urban health issues, including strategies to improve deprived urban living conditions, create healthy urban governance, and reduce powerlessness of those experiencing urban poverty (WHO KNUS, 2008).

Recent developments in the establishment of urban health research include the founding of an international society (International Society for Urban Health, www.isuh.org) that hosts an annual international conference as well as a journal dedicated to the topic (the *Journal of Urban Health*, published by Springer) and recent books and reports on population health in urban settings by Galea and Vlahov (2005), Freudenberg, Galea, and Vlahov (2006), and WHO KNUS (2008).

Unidisciplinary, Multidisciplinary, and Interdisciplinary Research Studying Urban Health Phenomena

In the early development stages of urban health research, the field was challenged because various disciplines studying the same urban health issue used different definitions and language regarding the health effects of urbanization and rarely collaborated despite common fields of study (Vlahov & Galea, 2003). Urban health research was undertaken using mostly unidisciplinary and multidisciplinary approaches, with fewer interdisciplinary studies being generated. Yet, very different kinds of knowledge are generated depending on what approach is taken, as described by Rosenfield (1992). Unidisciplinary approaches are studies that are initiated and carried out by those within a single discipline. According to Rosenfield (1992), multidisciplinary research occurs when researchers work sequentially or in parallel to each other on a topic, but do so from their own discipline. Interdisciplinary research occurs when researchers from different disciplines collaborate jointly on projects concerning the same topic, but still draw from and remain true to their own disciplinary training. The next level of integration of the disciplines occurs with transdisciplinary (TD) research. This approach involves "researchers working jointly using shared conceptual frameworks drawing together disciplinary theories, concepts, and approaches to address a common problem" (Rosenfield, 1992, p. 1351). These frameworks therefore combine and extend "discipline-based concepts, theories, and methods to address a common research topic" (Stokols, 2006, p. 67).

While we agree with this definition, we expand it to include other collaborators such as community or policy partners. That is, our own experience with TD research involves teams composed of individuals with academic and non-academic backgrounds who are all concerned with solving the same health problem. We next

use the example of intimate partner violence to illustrate a more in-depth exploration of the differences between uni-, multi-, inter-, and transdisciplinary approaches.

Intimate partner violence (IPV) is a significant public health problem with lifetime prevalence reaching as high as 40% in some North American studies (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). The health and social consequences of being a victim of partner violence include mental health problems such as depression, substance use, and post-traumatic stress disorder (PTSD); physical injuries from physical or sexual violence; reproductive and sexual health problems such as unwanted pregnancy from sexual abuse; loss of wages and work days; housing instability and even homelessness (Campbell et al., 2002; Kaminer, Grimsrud, Myer, Stein, & Williams, 2008; Messing, 2008; O'Campo et al., 2006; O'Campo, Ahmad, & Cyriac, 2008; Pallitto, Campbell, & O′Campo, 2005; Roschelle, 2008; Swanberg & Logan, 2007). Furthermore, while most of the research in this area has been with households residing in urban areas, there are differences in prevalence, resources available, resources accessed by victims of abuse, environmental influences, and even coping styles in urban versus non-urban areas (Burke, O'Campo, & Peak, 2006; Shannon, Logan, & Cole, 2006).

An example of unidisciplinary research on partner violence comes from the field of psychology concerning perpetrators of IPV. Such research is critical as only a relatively small proportion of the overall research on IPV is concerned with perpetrator issues. From the perspective of psychologists, Carrud, Jaffe, and Sillitti-Dokic (2008) studied attachment styles of perpetrators of violence in an attempt to link attachment to emotional aggressiveness and controlling behaviours. While this factor may be important in understanding perpetration, the authors did not consider other relationship characteristics (e.g. marital or cohabitation status, length of relationship, and status inconsistency where one partner has a higher socio-economic position than the other) or potentially important variables such as social class, which limit the application of the findings to a broad set of contexts or situations.

A separate study on perpetrators of IPV from the field of criminology, conducted around the same time as the study by Carrud et al., focused on the role of police data in the prediction of the continuation and escalation of IPV episodes and criminal persecution for IPV. Several variables contained in police data were found to be useful in determining these outcomes such as the use of a weapon, use of threats to injure/kill the victim, perpetrators' involvement with the criminal justice system, and cohabitation/separation status, to name a few. These factors are commonly studied in criminology but are often not of primary interest in psychology, public health, or clinical health studies on IPV. Thus, while these two unidisciplinary studies are both concerned with identifying perpetrator factors associated with IPV, taken together they also illustrate a multidisciplinary approach to the study of perpetration of IPV (i.e. parallel investigations of the topic from different disciplinary perspectives). The strengths and limitations to this approach will be briefly outlined.

First, the variables identified in each of these studies are valid factors that are supported by disciplinary-specific theories and a history of previous research on those particular topics. Second, taken together, these studies identify a broad range of perpetrator factors that are associated with IPV. In fact, if the issue of IPV

perpetration was studied within a single discipline, this full set of factors would not have been identified. Yet, on the other hand, it is unlikely that continuation of a multidisciplinary approach, through the parallel study of IPV perpetration with continued segregation of the disciplines, will lead to an integrated framework or understanding of perpetrator factors important for IPV.

This brings us to the next level in the study of IPV, an interdisciplinary approach. Our example here focuses on IPV in the workplace. While much IPV occurs in the home, emerging research is starting to explore the ways in which IPV spills over into non-home environments such as the workplace (e.g. stalking at work, harassing co-workers about the victim, or even barring women from attending job training). An example of an interdisciplinary approach is a collection of papers put together in a special issue of the *Journal of Interpersonal Violence* on IPV in the workplace (Swanberg & Logan, 2007). The chapters in this collection are from authors from a wide variety of disciplines such as social work, management, human resource management, sociology, psychology, and anthropology. The topics are also very broad and include stalking in the workplace, support or stigma that results from disclosure to other co-workers, an examination using a gender role theory of women in higher status and higher paid jobs (an area that is rarely studied especially in relation to IPV), organizational costs of IPV to workplaces, and the interrelationships of social support, stable or unstable employment, and IPV. While this is an emerging area of investigation, these papers advance our understanding of the myriad ways in which IPV impacts the workplace and point to areas in which workplaces can provide support to women who are victims. There is a richness to the information generated given that the papers drew from multiple disciplines and involved authors from more than one discipline.

We finally give a brief look into how IPV research can be approached using a TD perspective. The example concerns the assessment and implementation of an IPV community response system (Ritchie & Eby, 2007). An existing community coalition invited academics from a local university to their meetings in which research activities had been ongoing. The research project sought to identify available community-based services to individuals and families experiencing IPV as well as any barriers to effective service delivery. The seven-member research team comprised academics from the fields of social work, community psychology, and women's studies as well as two community members who had expertise in community development and front-line social work. The team sought to ensure that all disciplinary and community perspectives were represented in all aspects of the project, and many of the activities prioritized the needs of the community-based stakeholders affiliated with the research and project team. The whole process was not without struggle and constant adjustments as noted by the authors, in part stemming from the different perspectives and priorities around the research table. The research findings generated were viewed by the community as not only being rigorous but also being familiar as they mirrored what the community had already identified through anecdotes. The voice of the community was also recognizable during public presentations of the findings.

The characteristics of this project described by the authors are very consistent with what Rosenfield has described as TD. Yet, it should be noted that the

authors refer to their work as "interdisciplinary". The conflation of multi-, inter-, and transdisciplinary approaches to research is not uncommon and is discussed later in this book. While the authors refer to their work as interdisciplinary, we felt that it was also a clear example of a TD approach and treat it as such here. In fact, anecdotes from this project nicely summarize the experiences and sentiment of many TD projects. The authors note that their approach to their research, while yielding many benefits, also requires time, community building, and a long-term commitment. They further note while promoting their TD approach that the problem of community response to IPV does not stand in isolation but "must be understood in context, as embedded in a network of multidirectional causation and manifestations involving a variety of systems (e.g. social, psychological, biological, spiritual, economical, and political). Disciplinary blinders can limit the vision necessary to adequately address such issues and problems" (Ritchie & Eby, 2007, p. 141). These struggles are, as we will see in the next section and throughout this book, part and parcel to a TD research approach and necessary for holistic problem solving required to address complex health issues. Yet, in our opinion and in the opinion of many who undertake TD research, the benefits outweigh the negative impact of these struggles.

TD Research for Urban Health

As the examples of research on IPV showed, urban health issues are socially complex and multi-dimensional that are affected and constrained by the environmental and political contexts in which they occur. As shown above, an understanding of the complexity and uniqueness of health problems that arise in urban environments is beyond the scope of any one discipline. In contrast to interdisciplinary research, TD research is carried out not just by academics but also by the community, policy makers, practitioners, and other stakeholders who work together as a team and draw upon their expertise and experience to jointly develop a "shared conceptual framework drawing together disciplinary-specific theories, concepts, and approaches to address a common problem" (Rosenfield, 1992, p. 1351).

Hence, transdisciplinarity distinguishes itself from other cross-disciplinary approaches such as interdisciplinarity and multidisciplinarity in that a "fusion" of different disciplines and perspectives into a common conceptual framework is involved (Wickson, Carew, & Russell, 2006) and that researchers are expected to leave the comfort zones of their disciplines (Lawrence & Depres, 2004; Rosenfield, 1992). As discussed, this fusion of disciplines and experts can include non-academic or non-scientific stakeholders such as community organizations or the population of study (Ramadier, 2004; Smith, 2007). However, all types of expertise are considered equally important; not one academic discipline or area of expertise is privileged throughout the research process.

One of the benefits of a TD research approach is that it allows researchers to "go beyond a linear application of a static methodology and aim for an evolving, dynamic, or responsive methodology that is iterative and an ongoing part of the research process" (Wickson et al., 2006, p. 1051). TD work provides the research

team an opportunity to examine various dimensions of a problem through a number of methods, which in turn facilitates moving research into practice. Further, TD research is problem focused and concerned with problem solving rather than hypothesis testing (as is the emphasis in much disciplinary research). TD work is therefore action oriented and aims to achieve social change by connecting knowledge to real-world solutions (Kessel & Rosenfield, 2008; Lawrence & Despres, 2004), for example, by informing public policies or developing and informing programs and interventions. The actionable nature of TD research is facilitated by ongoing knowledge exchange processes that are weaved throughout the entire research process to inform all stages of the investigation so that there is a "constant flow between knowledge and practical application" (Smith, 2007, p. 161).

In summary, the TD research approach is problem oriented, dynamic, contextual to the application and research focus, creates knowledge for impact, and is socially accountable. Since TD teams comprise experts from different backgrounds, this type of research will almost certainly require a mixing of methods, creation of new methods, and/or a willingness to consider alternative epistemological models. A TD approach therefore lends itself well to urban health research as it seeks to solve problems that are complex and multi-dimensional (Wickson et al., 2006). That is not to say that the TD approach is the end-all solution for applied researchers as it may not be ideal for every type of undertaking. In particular, TD researchers may confront challenges such as learning to speak the same language when building a shared understanding of a topic (see Chapter 2). However, we believe that applied problems that are complex and unique, such as those related to urban health issues, are ideal candidates for TD inquiry.

Aims and Organization of the Book

This book will introduce TD research as it relates to urban health issues and will discuss the contributions it can make to the field of urban health. The aims of the book are to

(1) introduce a wide audience of researchers, policy makers, community organizations, and funding agencies to the concept of transdisciplinarity and its promise for urban health research;
(2) provide readers with information on theoretical backgrounds, methodological approaches, and case examples of TD urban health research;
(3) provide information for researchers to utilize and apply this approach in their own work and to develop skills in the knowledge transfer of TD findings; and
(4) foster a dialogue between researchers, policy makers, funders, community-based organizations, and academia on the promising contributions of TD urban health research.

The book is divided into four parts. The first part introduces the TD research approach and discusses its potential for exploring complex health problems. In Chapter 2, Nicole Schaefer-McDaniel and Allison Scott draw on their own

participation in a TD research project on best practices in community-based treatment for homeless adults experiencing concurrent mental health and substance use disorders to highlight the strengths and challenges this type of collaboration has for researchers. Particularly, they suggest that TD collaboration has the potential to foster a deeper understanding of the phenomenon of inquiry but it is also associated with difficulties and challenges around group dynamics and communication. In Chapter 3, Maritt Kirst, Jason Altenberg, and Raffi Balian illustrate the many benefits that TD work can have for community members involved in the research process. The chapter discusses how a TD research approach can build community-level capacity for health improvement and provides examples of community members' experiences of working towards and within a TD approach in the area of substance use and harm reduction research.

The second part of the book presents various case studies in which TD research methods were used to explore important topics related to North American and international health issues. In Chapter 4, Jessica Goodkind, Ann Githinji, and Brian Isakson present the Refugee Well-Being Project (RWP), an innovative mental health intervention that brings together refugee families and undergraduate students to engage in mutual learning and the mobilization of community resources to reduce health disparities experienced by refugee children and their families in urban areas in the United States. The case study involves a mixed-method longitudinal design, with program results indicating significant increases in English proficiency, access to resources, quality of life, and significant decreases in psychological distress among participants.

In Chapter 5, Erika Khandor and Kate Mason discuss a study on the health of homeless adults in Toronto, Canada which applies principles of community-based participatory research within the context of TD collaboration. Their chapter highlights the importance of collaborating with diverse stakeholders including the community of study and demonstrates how wide advocacy and dissemination efforts are successfully integrated into a TD framework. Chapter 6, the final case study by Helen Roberts, Susan Smith, Betty Campbell, and Cathy Rice, takes readers to Corkerhill, Scotland, in the early 1990s. The authors reflect on their experiences and involvement in a community-based participatory study on child injury, one of the first projects to combine multiple methods within that research topic.

The third part encompasses chapters that discuss methodological and practical issues related to TD urban health research. In Chapter 7, Patricia Erickson and Jennifer Butters present a case study of two research projects that were both focused on substance misuse and dependence among at-risk youth. One project was a unidisciplinary effort rooted in quantitative criminology; the other brought diverse perspectives to bear in an evolving TD undertaking. The authors suggest that the latter approach was more inclusive, flexible, and adaptive to circumstances in the field and may have greater potential for practical impact. In Chapter 8, Shalini Misra, Kara Hall, Annie Feng, Brooke Stipelman, and Daniel Stokols discuss the nature of collaborative processes necessary to facilitate and conduct TD research. They also propose strategies for improving the effectiveness of TD collaborations and suggest directions for future research.

A TD research approach is characterized by a unique knowledge translation process, in which dissemination of findings to stakeholders is ongoing throughout all stages of the research in order to ensure that results are relevant and actionable for policy development. In Chapter 9, Kelly Murphy, Bev Wolfus, and Aisha Lofters consider how the TD approach facilitates more adequate understanding of complex problem-solving contexts and processes and discuss how TD research practices open up new pathways for mobilizing research evidence in healthy public policy.

In light of increased recognition of transdisciplinarity as an important research approach in the urban health field, mechanisms regarding the management of TD team collaboration, funding sustainability, and academic/intellectual support of this approach continue to evolve (Kessel & Rosenfield, 2008). The fourth part of the book thus considers current trends in structural advancements in TD health research and the need for further evolution. While TD health research is still relatively new, US federal agencies have funded numerous training programs, and in Canada, the Canadian Institutes for Health Research has funded over 80 five-year training programs nationwide. Thus, given that training is an important aspect of the emergence of TD research, the fourth part includes a chapter concerning the training of future TD health researchers by Misra and colleagues. This chapter systematically discusses distinguishing features of TD training programs for both doctoral and postdoctoral trainees, methods and metrics that are suitable for evaluating TD training, and some of the challenges encountered by these programs.

Increasing recognition in North America of the transdisciplinary approach as a viable method for understanding complex health issues has led to increased dedicated funding opportunities supporting its use. In Chapter 11, Joy Johnson, from the Canadian Institutes of Health Research, and Sharon Hrynkow, from the National Institutes of Health Research in the United States, comment on the current state of funding for TD health research and speculate about the future. Finally, Chapter 12 summarizes the strengths and challenges of conducting TD urban health research and makes recommendations for the advancement of this approach.

TD research has numerous benefits to offer the field of urban health with perhaps an equal number of challenges. In the chapters that follow, we seek to document myriad examples and perspectives on TD research to ensure that challenges can be minimized and that the field continues to successfully evolve.

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Chapter 2
Benefits and Challenges of Transdisciplinary Research for Urban Health Researchers

Nicole Schaefer-McDaniel and Allison N. Scott

The previous chapter outlined how transdisciplinary (TD) research, namely research that integrates divergent perspectives, frameworks, epistemologies, methods, and theories, enables urban health researchers to gather a more comprehensive understanding of social phenomena. In this chapter, we highlight the strengths TD research provides for urban health researchers as well as some of the challenges they can face. To illustrate our discussion, we will draw upon the following TD case study.

Realist Review of Community-Based Services for Homeless Adults with Concurrent Mental Health and Substance Use Disorders

An example of TD research is a recent study from the Centre for Research on Inner City Health (CRICH) at St. Michael's Hospital in Toronto, Canada. This project was part of a Canadian Institutes of Health Research (CIHR)-funded training program–Strategic Training Initiative in Health Research (STIHR) (see Chapter 11 for more information on this type of funding) focused on training young researchers across various disciplines at the pre- and post-doctoral level in the health of marginalized populations. The goal of this particular study was to conduct a systematic review of academic and non-academic literature on existing community-based treatment services for homeless adults with concurrent mental health and substance use disorders. Unlike traditional systematic reviews that focus on whether or not a particular intervention works, the aim of this study was to understand not only which programs are successful but also *what* it is about these programs that worked and why (O'Campo, Kirst, Schaefer-McDaniel et al., 2009).

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The topic rose out of a stakeholder scan CRICH conducted with community-based health organizations in downtown Toronto to identify pressing service and policy needs. Lack of knowledge about services geared specifically for marginalized people experiencing concurrent mental health and substance use problems emerged as a recurring theme. When academic researchers met with community agencies to discuss these findings, it was the community that asked researchers for evidence to help meet their specific service needs. Thus, similar to other TD projects that are discussed throughout this book (e.g., see Chapter 3 and Chapter 6), it was the community that initiated this project and set the course of much of the research. For example, from the beginning, this project was concerned with an applied research question that sought to create knowledge that could be directly translated into action. While we originally focused on the issue of treatment programs for adults experiencing concurrent mental health and substance use problems more broadly, we narrowed our scope to the homeless population over the course of the project since this represented a population that was served by most of the community partners involved in the study.

In order to examine best practices in service provision, a TD research team was assembled consisting of representatives from five community agencies that provided frontline services for marginalized people in Toronto, graduate students, pre- and post-doctoral research fellows, and academic faculty with a wide range of expertise including social epidemiology, psychology, biostatistics, sociology, ethics, knowledge translation, community medicine, public health, and social work. Together, the team integrated the represented expertise and experiences and conducted a synthesis of academic publications, non-scholarly literature, and key informant interviews, as well as an appraisal of the quality of each piece of evidence. The transdisciplinarity of this project was further evidenced by the iterative and dynamic methodology that guided the research process, namely a realist review (Pawson, 2006; Pawson, Greenhalgh, Harvey, & Walshe, 2005) and narrative synthesis. In line with the action-oriented nature of TD research, academic team members worked together with community partners to translate findings into knowledge translation products useful for community agencies' advocacy and planning activities in the second stage of the project.

[Multiple] Heads are Better than One: Strengths and Benefits for TD Researchers

One of the most important benefits of taking a TD research approach is that it allows investigators to examine the issue of inquiry from many different perspectives and points of view. Such in-depth, day-to-day collaboration between individuals with different expertise allows for frequent collisions between disciplines, exposing assumptions, paradoxes, congruencies, and conflicts among them. While these confrontations can be frustrating and may slow the pace of research, they are also extremely beneficial to the research process and topic of inquiry as they often raise

important issues that would otherwise have been missed. Specifically, by exploring these paradoxes and conflicts as well as examining how information from diverse disciplines intersects, new understandings of the phenomenon can arise and new research directions can emerge (Ramadier, 2004).

Our case example, the 'Realist Review' of community-based services for homeless adults experiencing concurrent mental health and substance use problems, is a good example of the benefits of exploring paradoxes at the intersection of disciplines. The literature search yielded a group of 10 heterogeneous community treatment programs for homeless persons experiencing concurrent disorders. Each program contained many different treatment components in many different contexts with variable success on mental health symptoms and substance use behaviours. A recent quantitative systematic review of similar programs for people with concurrent disorders found conflicting results between studies suggesting that the "resulting heterogeneity limits comparability of studies, the potential for meta-analysis, and the strength of inferential validity" (Drake, O'Neal, & Wallach, 2008, pp. 133–134). While this particular review concluded that there was some evidence that three service approaches were "probably" effective (namely group counselling, long-term residential treatment, and contingency management), Drake and his colleagues (2008) were unable to state *why* some of these programs were effective and some were not.

In contrast, the TD Realist Review examining services for homeless adults experiencing concurrent disorders was able to make sense of such conflicting information by drawing on (a) epidemiological principles to appraise quantitative evidence, (b) realist review principles to highlight the importance of context, (c) experiential knowledge of service providers to ground the literature, and (d) a narrative synthesis approach to closely analyze the content and effectiveness of the programs. This TD study by O'Campo et al. (2009) found that six program components (e.g., the provision of housing, building quality relationships between provider and client) appear to contribute to success in reducing mental health symptoms among homeless persons with concurrent disorders.

Another benefit of TD research is that research teams have wider access to theory, research literature, data collection methods, and analysis techniques thus equipping them with more tools to study a particular phenomenon. This can assist team members in asking clearer and more appropriate research questions and utilizing more appropriate (and more creative) data collection and analysis techniques for the problem at hand. That is not to say that "more is always better" since the inclusion of more literature, theory, methods, and other research tools can also be conflicting and confusing. The challenge in TD research lies in finding the correct balance and determining when information (e.g., as it relates to the conceptual framework or topic of a study) has been satiated, a process that in our opinion can only successfully take place through (multiple) discussions with team members representing diverse areas of expertise.

In the Realist Review example, representation from different disciplines assisted greatly in building a comprehensive list of search terms for the literature search, identifying appropriate sources of non-academic literature, and in designing a

research question that was practical, viable, rigorous, and fulfilled a need of the community. We also utilized epidemiology's rigorous approach to quality appraisal to evaluate the quality of the quantitative studies and capitalized on the strengths of qualitative narrative synthesis to infer how and why certain programs worked.

Close collaboration among individuals with different areas of expertise can also act as an inherent "quality control" mechanism and provide a support system for team members. This is especially true when community members or service providers are included in the research team. For example, community partners in the Realist Review example were the first to point out to the academic team members that one of the reviewed service approaches as it was described in the US literature had little in comparison with how the same service program was being carried out in Toronto, Canada. This information shaped how that service approach was described in research bulletins and publications designed for Toronto policy makers to ensure there were no misunderstandings.

A TD research team may also be better equipped to point out design flaws, threats to feasibility or validity, and whether the work replicates a research agenda or finding from another field of inquiry. Furthermore, the multitude of expertise involved in TD collaboration helps team members anticipate practical, moral, and ethical problems that might arise in the course of the research and develop an appropriate course of action. This is particularly important for work with marginalized or vulnerable populations.

TD research also has the potential to increase resources for team members. For example, academic partners can access funding options outside their disciplines by partnering with experts from other areas. Similarly, partnering with academic members can increase community partners' resources by providing access to academic libraries, academic publications, and research expertise. In the Realist Review case study, the community partners were able to use results of the project and the expertise of the academic partners in various ways to meet their organizational needs. The team not only produced a community report that could be used for advocacy and to seek program funding but also developed two policy bulletins and a protocol for an internal evaluation for two of the community partner organizations to assess the effectiveness of their concurrent disorder programs.

Another substantial benefit of TD research that includes community members is that the community can influence the direction of the research project such that it fulfils their needs. This can ensure that the research that is produced is of practical use to the community and policy makers and thus has impact outside the academic community. The inclusion of policy makers, community members, and researchers with varying areas of expertise on the research team provides a natural vehicle for dissemination of the findings and can enhance the credibility of the research in the eyes of fellow policy makers and community members. Community members and policy makers have the expertise and the connections to produce knowledge translation events that can impact news media. In the Realist Review project, community members shaped the research question and gave continuous feedback as to the kind of information that would be useful for them. Furthermore, because of the partnership generated by the project, two community partners collaborated independently,

outside the joint Realist Review project, to launch a policy bulletin on "Women and Homelessness" (Street Health, 2008). They also organized a "speak-out" evening where homeless women could speak with provincial officials about their concerns and how poverty affects them. This event was videotaped and given to key public officials along with copies of the bulletin, and the campaign made an impact on news media (Monsebraaten, 2008). The ease with which the community organizations organized such a successful advocacy campaign impressed the partnering academic members and was another demonstration of how academics can benefit from community expertise.

Many Hands [Do Not] Make for Light Work: Challenges for TD Researchers

Despite the many benefits associated with TD research, it is also a very labour-intensive undertaking since it involves a great deal of negotiation and discussion in order to bring together team members, their disciplines, and areas of knowledge. This negotiation, if not handled carefully in an open and accepting environment, can result in tension and possibly conflict. As Stokols (2006) suggests, TD research "requires an ethic of resolute openness, tolerance, and respect toward perspectives different from one's own and a commitment to mutual learning and mediational processes in which contrasting values and conflicts of interest are negotiated and accepted, if not entirely resolved" (p. 68).

In this section, we discuss challenges associated with TD research in terms of team composition and group dynamics as well as in relation to academic realities.

Process Challenges

One of the first challenges associated with TD research deals with team composition and structure. At the onset of TD collaboration, investigators might find themselves pondering the following questions: How should team members come together? Who should be invited to join the collaborative team? Which areas of expertise and experience need to be represented? Clearly, there is no absolute answer to any of these questions as they are dependent upon a number of issues such as the topic of inquiry, the financial support for the project, the physical location of team members, and members' interests and availability.

Once a team has been assembled, additional challenges well known to team collaborations can quickly arise such as determining how decisions will be made, agreeing on a research and action plan, as well as deciding how the project will be managed and led. Bringing a diverse group of people together to work on the same research problem automatically raises concerns related to group and power dynamics. For example, team members might have varying priorities for researching the particular issue and consequently advocate for diverging starting points and

directions of inquiry. Power struggles can also emerge if team members do not recognize other types of knowledge as valid or do not respect others' worldviews and epistemological paradigms (see Gray, 2008; O'Cathain, Murphy, & Nicholl, 2008). Wallerstein (1999) recommends that in order to develop productive relationships in team research, it is crucial for team members to reflect on their own positions of power, privilege, background, and experience as these "characteristics inform our ability to speak and interpret the world" (p. 49). Furthermore, Wallerstein and Duran (2006) encourage team members to examine their own motivations for participation as levels of participation often vary by degree of project ownership. O'Cathain et al. (2008) and Wallerstein (1999) recommend discussing issues surrounding group and power dynamics from the beginning as well as throughout the entire course of a team project as group dynamics need to be carefully negotiated and time is required to build trust and strong working relationships among team members.

We find that leadership is very important in mitigating, negotiating, and avoiding the above-mentioned pitfalls in TD work. While each team will need to decide on its own leadership and organizational structure and discuss what type of coordination would be most beneficial, in our experience, a good TD team leader is one who is committed to the project and to the principles of equity and democratic decision making; keeps the group on track, organized, and moving forward; and is comfortable mediating disagreements. Further, we find that good TD leaders view their role as facilitating and supporting the will of the team, 'leading from behind,' rather than authoritatively determining the direction of the team.

TD researchers need to be mindful of group dynamic issues and, at the onset of a project, set an appropriate amount of time aside to ensure that careful planning and preparation can take place. A "Terms of Reference" agreement is a useful tool that can help group collaborations overcome some of these challenges. Such a document generally outlines project goals and objectives, guiding principles that members agree to abide by (see Israel, Eng, Schulz, & Parker, 2005), team members' roles and responsibilities, and procedures for how decisions will be made. In the Realist Review example, it took 2 months to develop and negotiate our Terms of Reference. The group felt that taking the time to discuss this agreement was helpful in setting the tone for democratic group collaboration and served as a helpful guide that could be referred to throughout the course of our research. Taking time at the beginning of a joint collaboration ensures that team members understand each others' goals, expectations, and values regarding team work and collaboration and prevents future misunderstanding and conflict. It is also noteworthy to keep in mind that a "Terms of Reference" agreement does not need to be finalized at the onset of a project. Rather, it can evolve over time as the team encounters new challenges or situations.

Another challenge commonly associated with team research such as TD collaboration has to do with communication. For example, the use of academic language (i.e., jargon) to dominate a conversation can exclude some members (e.g., community team members, academics from different disciplines). This difficulty can also arise when power is equally shared among team members: discipline-specific language that might be natural and easily understood for some team members can be

unintelligible to others. More dangerous, however, are words that have common usage but very specific connotations within a particular discipline such as "bias" in epidemiology, "political" in the qualitative traditions, or "theory." In the Realist Review project there were several heated discussions that were finally resolved when we realized that team members were talking about the same issue but were using different language to express themselves or were using the same language but referring to different issues. Team members must be prepared to spend time learning new vocabulary and concepts or relearning old ones so that all investigators share the same understanding and meaning of the topic and issues at hand. Team members should thus be on the alert for communication difficulties, pause and spend the time to explore the meanings behind the words that are used, and ensure that everyone understands each other. Building a new shared vocabulary can be a very time-consuming and frustrating experience, and as Peter Smith (2007) reminds us, "there are no benchmarks to indicate when a researcher has achieved sufficiently familiarity with the other disciplines in a research team" (p. 163).

A similar challenge that can arise in TD collaboration relates to arriving at the same understanding of what counts as evidence. Often, disciplines place emphasis on different concepts or aspects of (even shared) methodology. Team members need to be sensitive to these concerns and should discuss openly which specific methodologies, procedures, and findings will be considered valid, important, and necessary for rigorous research. While this challenge can complicate the research since not all team members may initially agree, it is essential that the team as a whole comes to a joint decision in order to advance the process of research. For example, in the Realist Review project, the epidemiologists were adamant about reporting confidence intervals, power calculations, and detailed information regarding study design and analysis, while the social scientists were less concerned with power calculations and more concerned with the context of the research and the interpretation of the findings. As a compromise, the team decided to place equal emphasis on contextual and statistical information.

Academic Support Challenges

Aside from challenges related to group dynamics and team composition, academic TD researchers may also struggle with academic realities as structural issues of academia, publishing, and granting agencies make it more difficult for these types of researchers to engage in TD collaboration. Specifically, universities and university-based research institutions provide "extremely strong incentives to work within an established discipline, using its established methodologies on problems that are deemed important in the field" (Hildebrand-Zanki et al., 1998). Firstly, there are often limited funds available for cross-disciplinary and TD collaboration, as compared to the plethora of funding streams for unidisciplinary research. While TD collaboration allows the team access to a greater number of funding agencies, unidisciplinary-specific funding streams may not look kindly on the additional

time and costs of TD research teams (for instance, expenses to accommodate group meetings and knowledge translation costs, see Chapter 8).

Secondly, in the current "publish or perish" academic climate, promotion and tenure greatly depend on the candidate's academic, peer-reviewed publication record. However, TD work is very time consuming and often requires additional projects that are not counted in the rubric for funding or tenure, such as writing bulletins for policy makers, giving community presentations, or other knowledge-translation activities. It is therefore not realistic for TD academic researchers to produce as many academic publications as disciplinary-based researchers, yet many academic departments and funding agencies do not have a mechanism to take these additional activities into consideration.

Authorship is a prime example of this. Because TD research teams can be quite large, the list of authors can be very long. In many academic traditions, the number of authors and the order of authorship are used to judge the amount of involvement and the amount of "ownership" an author had in a particular paper. Single-author papers in the social sciences and the first or last author role in the medical sciences are generally weighted more positively. However, academic researchers involved in TD research can find themselves contributing more time and effort to these types of publications compared to disciplinary publications without receiving similar acknowledgement in the order and configuration of authorship. This can be a disadvantage when funding agencies or university promotion bodies consider a researcher's publication record for career development. In order to legitimize such cross-disciplinary collaborations in the eyes of academic institutions, we encourage initiatives like those currently underway by the Community–Campus Partnership for Health (CCPH) which seeks to transform academic–community collaborations in the USA by addressing some of the challenges commonly faced by faculty engaged in community-based research including issues related to faculty development, adequate research dissemination, tenure, and promotion (http://www.ccph.info). For example, they recommend taking non-traditional publications such as technical and non-peer-reviewed reports to community organizations as well as the overall development of researchers themselves in terms of innovation and quality work into consideration when reviewing tenure applications (see Jordan, 2006).

Finally, finding an appropriate venue to publish a TD research project can also be a concern for researchers since many conventional, high-impact journals have a strong disciplinary focus that may not welcome other types of research endeavours including TD work (Smith, 2007). Furthermore, many of these conventional journals have strict word limits that are often not sufficient for TD researchers to adequately describe methods, process, and results of their TD projects making it thus challenging to reach the most appropriate audience. While a few specific TD academic journals currently do exist (e.g., *The International Journal of Transdisciplinary Research*, *Journal of Transdisciplinary Environmental Studies*), they tend to be very topic specific, covering issues related to economics or environmental studies, for example. With the increasing popularity of online journal subscriptions and the possibility of additional content available online, journals have the ability to allow for more in-depth discussion of research issues, so we encourage journal editors as well

as publishers to consider these suggestions to make TD research more accessible to target audiences.

Conclusion

In this chapter, we drew upon our experiences as team members in a Realist Review project to illustrate how combining and integrating various disciplines and perspectives in TD research can be a powerful tool for urban health researchers in understanding complex problems. The Realist Review project (O'Campo et al., 2009) benefited tremendously from the multitude of collaborators' expertise in defining the research question, selecting the appropriate review method, choosing search terms for the literature search, and disseminating the research findings to a broad audience.

By bringing various stakeholders together to work jointly on the same research question, TD researchers have access to greater resources and research tools and are more likely to develop a more complete understanding of the issue at hand. As with all types of team collaborations, this approach can also pose challenges including longer time investments, publication concerns, and issues related to group and power dynamics. However, given the complex nature of many urban health issues, we believe that finding successful solutions to these problems is beyond the scope of any one discipline. TD research with its focus on social change and action can thus be an appropriate approach for the study of urban health problems.

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Chapter 3
In Search of Empowering Health Research for Marginalized Populations in Urban Settings: The Value of a Transdisciplinary Approach

Maritt Kirst, Jason Altenberg, and Raffi Balian

The urban environment has become an important determinant of health in the context of increased urbanization over the last century (Freudenberg, Galea, & Vlahov, 2006; Galea & Vlahov, 2005). Along with a growth in urbanization has come increased socio-economic disparities and marginalization among populations living in many urban centres (O'Campo & Yonas, 2005). Social, political and economic processes have led to the unequal development of urban areas and health inequities in these environments. Such health inequities place socio-economically disadvantaged and marginalized populations (i.e. individuals experiencing stigma, social exclusion, a lack of economic resources) at greater risk of morbidity and mortality, and lower quality of life (Geronimus, 2000; World Health Organization Knowledge Network on Urban Settings (WHO KNUS), 2008). The social and economic conditions that lead to the poor health of these populations contribute to feelings of powerlessness and an inability to gain control over life circumstances, making powerlessness an important social determinant of health (Wallerstein, 2002; WHO KNUS, 2008).

The empowerment of the individual and the development of a sense of control over his/her health have thus been identified as crucial steps in addressing health inequities (Marmot, 2006; Pridmore, Thomas, Havemann, Sapag, & Wood, 2007). However, there is also a need for social interventions that seek to reduce health inequities in urban settings through the building of skills and experiences with which to assist marginalized populations in gaining greater control over their lives (Harpham, 2009; Wallerstein, 1999; WHO KNUS, 2008).

A growing body of research is focusing on the social and environmental factors that contribute to the poor health of socio-economically marginalized populations (Geronimus, 2000; Harpham, 2009; WHO KNUS, 2008). Health research approaches that involve the participation of marginalized populations in various aspects of the research process can facilitate access to knowledge, empowerment and capacity-building to affect social change with which to improve health in their

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communities (Wallerstein, 1999). In this chapter, we will discuss how collaborative, transdisciplinary (TD) research methods, with careful attention to building equitable research partnerships, present an important opportunity to build capacity to empower the broader community through the production of actionable health research. In our discussion, we draw on examples from research projects exploring health behaviours of marginalized drug users and related harm reduction programming. The examples represent the journey towards TD research taken by a working group engaged in advocacy and research on health risks and harm reduction practices among illicit drug users in Toronto, Canada, in which some of the authors of this chapter are actively involved (Balian and Altenberg). These examples illustrate important features of TD health research well suited to working with and for marginalized populations.

Considering "Transdisciplinarity"

In recent years, it has been recognized that determinants of urban health must be studied in a multisectoral and multi-level way in order to effectively examine their complexity and subsequently problem solve (Harpham, 2009). Furthermore, translating research into practice is an ongoing challenge for research addressing health inequities in urban settings (Harpham, 2009; Roche, 2008; Schulz, Krieger, & Galea, 2002; WHO KNUS, 2008). Research of this nature tends to produce evidence that is accessible primarily to the academic sector and is not easily translatable into social action at community and/or policy levels (Roche, 2008). A TD approach satisfies the growing need for multi-level and multisectoral urban health research as it brings together various disciplines, sectors, perspectives, and resources, and thus facilitates the examination of the problem and the ongoing translation of findings into community- and policy-relevant steps for action.

Nevertheless, while the principles of TD research embrace the involvement of various stakeholders (e.g. academics, service providers, service consumers, policymakers) and the types of knowledge they may provide (e.g. academic knowledge, lived experience, policy expertise), the term "trans-*disciplinary*" implies a primary focus on the contributions of academic disciplines to the research. This is somewhat counterintuitive to its goal of the equitable integration of various types of knowledge into research and to not privilege one discipline or type of knowledge above others. Such an emphasis on contributions of academic disciplines could possibly undermine research of this nature and imply a "credentialist" approach in which individuals who do not have academic training in a discipline, such as community members with lived experience of a particular phenomenon under investigation, are not welcome or their contributions will not be as valued or respected in the research process as someone with academic training (Travers et al., 2008). Perhaps the term "trans-*disciplinary*" should be revised to foster and guarantee more inclusivity in order to live up to its mandate to bring together various perspectives surrounding complex problems and move beyond traditional research methods and approaches with which to study and solve such problems.

Key Components of the TD Approach and Their Contribution to Research on the Health of Marginalized Populations

Despite such terminological limitations, there are several components of a TD research approach that can facilitate empowerment of marginalized populations with respect to health. In this section, we illustrate this argument through a broader, theoretical discussion of key components of the TD research approach, specifically drawing on qualities of community-based research (CBR) methods. Then, the discussion shifts to the first-hand experiences of co-authors Raffi Balian and Jason Altenberg in conducting community-based research on drug use-related risks and harm reduction programming needs in Toronto, Canada. Their experiences illustrate the importance of these components to the production of actionable health research and also present practical challenges in this process.

Collaborative, Participatory Methods in the Production of Cross-Sectoral Knowledge

A key component of TD research is that it involves collaboration not only across academic disciplines but with non-academic community stakeholders and policymakers as well (Balsiger, 2004; Stokols, 2006; Wickson, Carew, & Russell, 2006). This type of intersectoral collaboration facilitates the action-oriented nature of TD research, whereby the emphasis of academic collaborations on research and the emphasis of community groups on community action are linked. Such a linkage facilitates the building of mastery and empowerment of stakeholders and participants through raised awareness of the problem, knowledge sharing, and skills development and, subsequently, the more effective, direct translation of research findings into public policies (Stokols, 2006).

Empowerment through the collaborative dimension of the TD approach is consistent and aligned with the principles and methods of CBR. The compatibility of the TD approach and CBR methods is evident in CBR's definition as "systematic inquiry, with the participation of those affected by the issue being studied, for the purposes of education and taking action or affecting social change" (Green & Mercer cited in Leung, Yen, & Minkler, 2004, p. 504). CBR methods can empower marginalized populations through the involvement of community partners and those affected by the issue of study in all aspects of the research process, including conceptualization, data collection, analysis, interpretation, and ongoing knowledge translation. In theory, this involvement creates power-sharing between academics and community members, thus shifting authority over the research process away from experts and allowing for equal ownership of the research and subsequent findings. Collaboration between academics and community participants in CBR assists in identifying the social factors that affect the health of these communities and promotes building on community member/participant strengths and knowledge to effectively address these factors (Schulz et al., 2002). This results in findings that

are more responsive, "accessible, understandable, and relevant" to the interests and needs of participants and thus are more translatable into community-level social change (Leung, Yen, & Minkler, 2004). Furthermore, involvement of community members in all aspects of the research process validates their lived experience, which can be further motivation to affect social change.

However, the process of academic and community collaborations in the context of TD and CBR research can be challenging. A debate has emerged as to whether there is a disjuncture between CBR theory and practice in the sense that, in reality, the extent of community involvement in all stages of the research process may be less than desired. A recent analysis of CBR experiences in Canada showed that involvement of academic researchers and service providers was high in almost all stages of the research, whereas community members were the least engaged (Flicker, Savan, Mildenberger, & Kolenda, 2008). A low level of involvement of community members in CBR may relate to power imbalances and differing research agendas between collaborators. For instance, academic researchers and community members often have different agendas in that researchers seek to gain knowledge to problem solve on a broad level whereas community members typically seek to gain skills in order to problem solve within their local communities. In the process of partnering, academic researchers, equipped with research skills and funding, may take on the leadership role and may only consult community members at the beginning and/or end of the project, and/or may not present results to community members in an accessible way that is useful for the local community (Wallerstein, 1999).

In order for a TD approach that incorporates CBR methods to be empowering, it is extremely important that partnerships between the various sectors be equitable and negotiable in order to ensure that community partners who represent marginalized populations have a voice to advance the research endeavour (Benoit, Jansson, Millar, & Phillips, 2005). Without such equitable partnerships, the research collaboration can suffer from mistrust between partners and/or perceptions of "credentialism" and/or "tokenism", making the research findings less relevant and credible within the community setting. The consequences may in turn lead to lowered capacity within the community to address the complex health issue of study and create mistrust towards future research (Roche, 2008; Travers et al., 2008; Wallerstein, 1999).

Integration of Quantitative and Qualitative Methods

A TD approach nurtures the integration of various research methods derived from different disciplines (Wickson et al., 2006). The integration of quantitative and qualitative methods is particularly important for empowerment in research with marginalized populations. The inclusion of quantitative data can provide information on the extent to which social factors influence the health and health behaviours of marginalized groups. The inclusion of qualitative data can complement the quantitative findings and also fill gaps in explanations left by the quantitative data through the elucidation of rich, contextual information. The inclusion of both types

of methods and subsequent data, thus, allows for a more complete interpretation and explanation of study findings (Tolomiczenko & Goering, 2000). The elicitation of the lived experience of community members is an important inclusion in research on health inequities as it assists public health and epidemiological research in moving beyond its positivistic focus. It does so by situating individuals in the social contexts in which health inequities arise and by elucidating the meanings that individuals "attach to their experience of places and how this shapes social action. . ." (Popay, Williams, Thomas, & Gatrell, 1998, p. 636). The incorporation of qualitative methods and data thus provide greater explanatory power regarding the causes of health inequities and can facilitate greater understanding of the relationships between human agency and social structures that produce these inequities (Popay et al., 1998).

Furthermore, the inclusion of qualitative methods and data provides marginalized populations with a voice to express their stories and to capture their lived experience in meaningful detail. Being provided the opportunity to tell their stories can be an empowering experience for disadvantaged groups who have experienced adversity in life and are likely underserved and unheard with respect to health issues. The rich, detailed data elicited from qualitative, open-ended questions may also resonate with service providers, who may need and appreciate this information in more effectively meeting client health needs (Tolomiczenko & Goering, 2000).

Reflexivity

In order to allow for the empowerment of marginalized populations within the context of the TD research experience, reflexivity, a process in which the researcher reflects and questions the personal experiences that influence his/her interpretations of the data, is an important, yet challenging, component. Given the diverse skills and experiences comprised in the TD research team, issues with power dynamics will likely arise. In order to facilitate collaboration in light of such dynamics, it is recommended in TD work that the researchers become engaged and embedded with the research problem in order to gain an in-depth understanding. To achieve such a level of integration, it is important for the researcher to examine how his/her own position, beliefs, and experiences influence the research process (Wickson et al., 2006). Access to lay knowledge through collaboration with practitioners and marginalized groups in the community can facilitate such embeddedness. For researchers who are 'outsiders' to the groups of study, it is through this reflexivity that they can achieve a greater understanding of the lived experiences of these groups. Such a reflexive process may also facilitate a paradigm shift away from a predominant focus on risk and illness in social epidemiological research with marginalized populations towards an applied research approach focused on resiliency that can promote and build capacity for improvements in health among these groups (Harpham, 2009).

Academic and community members not only enter into the research collaboration with different experiences, but, as mentioned earlier, they enter with different research agendas with respect to purpose and outcomes. It is therefore extremely

important for the integrity of the research process that partners acknowledge and understand these differentials by reflecting on the meaning of participation (i.e. 'who' is participating, and why?) and how differing social positions or power dynamics may affect the process of participation (Wallerstein, 1999).

The Road to TD Research: Examples of the Evolution of Harm Reduction Research in Southeast Toronto

Injection drug and crack cocaine users are at risk of several health problems including substance abuse or dependence, HIV, hepatitis B and C, and other infectious diseases; endocarditis, skin abscess, mental health problems; and fatal and non-fatal overdoses (Fischer, Pouris, Cruz et al. 2008; Des Jarlais, Diaz, Perlis et al., 2003; Wong, 2001). Substance use and abuse are complex health issues, highly influenced by social, political, epidemiological, psychological, geographic and economic processes and determinants (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005). Harm reduction refers to a set of public health policies and programs that seek to reduce the risks and harms associated with injection drug and other types of substance use by providing drug users with new drug use equipment, condoms, information, and support with which to use drugs more safely, without requiring cessation of use (Ritter & Cameron, 2006).

The journey towards TD research on drug use for co-authors Jason Altenberg and Raffi Balian began in the mid-1990s in their work as harm reduction service providers and advocates in Southeast Toronto, Canada. Here, we present this journey through a discussion of their involvement and experiences with three research projects – one unidisciplinary, one interdisciplinary and one TD – on drug use-related risks and harm reduction.

Experiences with Unidisciplinary Harm Reduction Research

In the fall of 1994, concerned with the number of crack cocaine users in his constituency, a Toronto city councillor asked the public health department to do something about the increasing crack cocaine-use problem. The request went to the needle exchange program at the public health department, and its executive director called a group of workers together, including Balian, to see if there was anything they could do to address the growing problem. The initial meeting at the public health department took place just as crack cocaine was taking hold of Toronto's most marginalized drug users. At the conclusion of the meeting, the attendees agreed to form a committee to look into a variety of ways to tackle the issue in downtown Toronto.

Their first task was to examine the severity of the problem. For this, a questionnaire was devised to be distributed by harm-reduction agencies and organizations that worked with crack cocaine users. Crack users all over the city of Toronto responded to the questionnaires and when the responses were eventually examined,[1]

a disturbing image of the issue began to develop. Almost half of the respondents admitted to having injected crack at least once. Another worrisome factor was the extent of lip burns and mouth sores experienced among crack smokers combined with the liberal sharing of smoking equipment among the community, posing a risk for the spread of infectious diseases. During that period, harm reduction strategies for crack use were not available, and thus, the crack-using community was vulnerable to harms associated with drug-use equipment sharing. Finally, almost one-third of female respondents reported that they had been sexually assaulted after having used crack.

Next, the committee explored the potential of crack pipe distribution as a harm reduction intervention for crack cocaine users in order to reduce the risk of contracting infectious diseases through crack pipe sharing. The working group developed a plan to collect used pipes from crack users and test them for possible HIV, hepatitis, or tuberculosis contamination. Unfortunately, the project could not secure funding due to scepticism regarding the correlation between HIV and crack pipe sharing and the ability of community members to produce credible research; the project was eventually laid to rest. Balian and his partner at the time spearheaded the formation of an advocacy group comprising drug users, called the Illicit Drug Users' Union of Toronto (iDUUT), in response to the lack of accountability towards illicit drug users in general and towards crack users in particular, who, hitherto, had been voiceless.

Despite a lack of research evidence and support due to opinions that the distribution of crack pipes was illegal, the advocacy group developed "safer crack stem kits", consisting of a clean, glass crack stem/tube and other tools to use crack safely, and began distributing them to crack users. Because of the paucity of information regarding crack use and crack users in Toronto, the group also decided to gather as much information as possible during the safer crack stem kit distribution project and began further survey data collection on crack-use patterns and related risk behaviours among crack users. The results of the surveys conducted by iDUUT identified the increased use of crack by marginalized populations in Toronto and frequent crack pipe sharing and other health risk behaviour among these groups. The results were presented at a press conference and were shared with community agencies, the public health department and members of the research/academic community. The results were regarded by many, including epidemiologists, as some of the first and best data obtained from street level crack users at the time.

Due to iDUUT's persistence in approaching the academic research community for support, an academic research team eventually began to take interest and proposed a study to examine used crack stems as a potential vector for infectious disease transmission. Despite mobilization and the collection of valuable research data on the problem by community advocates for years, academic credentials emerged as an important issue for policy change, as it was only once academic researchers were engaged in investigating the problem and had released their findings that the safer crack stem kit distribution program became sustainable through the receipt of municipal and provincial funding. The safer crack kit distribution program gained official support from the city in 2005, more than 10 years after a local politician

raised concern over the problem and community advocates mobilized and began their harm reduction work.

Without this first piece of community action/research, harm reduction programs could not have begun to develop pragmatic strategies (i.e. safer consumption devices) to engage crack cocaine users. A recent evaluation study of a safer crack pipe distribution program in Ottawa has shown that this type of program can reduce the risk of transmission of HIV, hepatitis C and other infectious diseases among drug users (Leonard et al., 2008). This example illustrates that, despite numerous attempts of community members to bring about change through collaborated efforts, ultimately the lack of partnership among community, policy-makers and researchers led to a delay in implementation and benefits of an important public health initiative for marginalized populations. User/activist knowledge and empowerment to mobilize, exemplified in iDUUT's efforts to collect data and initiate safer crack stem distribution, were an important precursor for harm reduction programs and academic researchers to access and further mobilize that community surrounding this issue. Since that time, a relationship among the crack-user community, health services and the research community in Toronto has been built thus demonstrating the need for these key stakeholders to be sitting at the research table at the same time and throughout all stages of the research process.

Experiences with Interdisciplinary Harm Reduction Research

In 2003, equipped with lessons learned from the previous crack cocaine risks and harm reduction research initiative, Balian, then the program coordinator of COUNTERfit, a harm reduction service program in the South Riverdale Community Health Centre (SRCHC) located in Southeast Toronto, and Altenberg, director at Alternatives East End Counselling Services at the time, partnered with two sociologists at the University of Toronto[3] to conduct community-based, participatory action research (PAR) to explore the integration of harm reduction and mental health services. The question of integrating harm reduction and mental health services arose from an active partnership between COUNTERfit and Alternatives and as a result of successful collaboration in service delivery. The mental health service system in the province of Ontario was being reviewed at the time. The need to integrate mental health and substance use programs was an established "good practice" from a policy perspective, given increasing awareness of the challenges experienced by individuals with concurrent mental health and substance use disorders in navigating separate mental health and substance use treatment systems (Altenberg, Balian, Lunansky, Magee, & Welsh, 2004). The details of service integration were still being developed in a variety of settings.

Balian and Altenberg were concerned that the needs of many individuals experiencing concurrent disorders would only be addressed successfully via integrated strategies and programs that also included an integration of harm reduction principles and practices. They wanted to use their experience to impact practice at both the local and provincial levels. Balian and Altenberg approached the academic

researchers for guidance on how to conduct research with this purpose in mind. The PAR qualitative study sought to explore, through a series of focus groups with service providers and service users, how integrated mental health and substance use services might help reduce mental and physical health issues and social problems among drug users in Southeast Toronto (Altenberg et al., 2004). Based on themes generated from the focus groups, the study yielded a number of recommendations for mental health and substance use services, including: the integration of harm reduction and mental health services to reduce stigma towards drug users and increased access to treatment; the inclusion of service components such as community-based outreach and flexible hours; the encouragement of staff qualities such as non-judgemental attitudes and lived experience; the development of harm reduction-based counselling for service users; capacity development for other community programs to incorporate a harm reduction perspective into service provision (Altenberg et al., 2004).

Upon reflection, members of the research team saw many advantages to the partnership. Service users were an integral part of the research process, building research skills by informing research materials and facilitating focus groups. The experience also required the negotiation by partners of differing experiences and agendas affecting the research process. Altenberg notes:

> The process of conducting research, collecting and analysing data forced us to come to terms with the difference between our beliefs and experiences and those of service users and other providers who had experiences with mental health, substance use, and harm reduction services. Our academic partners, while sharing our goal to improve services for people with mental health and harm reduction needs, did not have the conviction derived from experience and approached the data with a different lens than ours as service providers and program managers. What we came to the research with as assumptions of truth, our partners questioned. In some way it felt as if our priority was particular outcomes and theirs was the integrity of the process. In holding us to that need for "validity," we came to more nuanced understandings of the needs of the community we served and forced us to accept, what seemed to us at the time and still seem to be, contradictions in what service users and providers found most useful in addressing mental health and substance use issues (i.e., using a harm reduction perspective in one service but not always in the other).

Since the completion of this study, an Urban Health Team at SRCHC was created that addresses the specific needs of drug users and those with mental health issues. This program was informed by the recommendations that emerged from the project in the sense that unique integrated mental health and harm reduction services have been created, incorporating staff positions for individuals with lived experience. The process of PAR and interdisciplinary research has had an impact on the Team's vision for the services they provide. It has impacted how they approach interdisciplinary work in that they acknowledge and expect the research team to see things from diverse perspectives, to challenge each other, and in so doing to improve the breadth and depth of how health problems and issues are approached.

Experiences with TD Harm Reduction Research

A TD research approach can contribute to the evolution and advancement of theory that has the potential, when set into policy, to build capacity within marginalized communities to improve health. As discussed earlier, injection drug use is a complex health issue that is affected by social, political, epidemiological, psychological, geographic and economic processes (Rhodes et al., 2005). Such complex issues demand a research approach that considers the impact of all of these factors on the health behaviours and outcomes of drug users. Interest in the use of a TD approach is growing in the addiction research field (Abrams, 2006; Sussman, Stacy, Johnson, Pentz, & Robertson, 2004), as the approach facilitates the merging of methods and multiple, relevant perspectives in the exploration of the various intersecting factors that affect substance use and abuse.

Informed by the benefits and challenges of previous unidisciplinary and interdisciplinary research collaborations, Balian and Altenberg became involved as partners in a national, multi-site surveillance project regarding the risk behaviours of injection drug users in Canada. The project sought to increase understanding of the HIV epidemic among injection drug user populations through improved surveillance using epidemiological, socio-behavioural, ethnographic and community-based research (Public Health Agency of Canada, 2006). The project established a national surveillance system to monitor injection drug use (IDU)-related risk behaviours to inform provincial and municipal program planning and evaluation.

The project involved a multi-site team of epidemiologists, physicians, social epidemiologists, public health researchers, community harm reduction program staff, drug users and policy-makers. Each of the seven sites had a lead researcher, and each site was encouraged to create local research questions specific to their particular region. In Toronto, the principal investigator worked with local stakeholders, including service providers, drug users and policy-makers, to formulate research questions relevant to drug-use trends and complex service needs within the Toronto context. Interviewers included individuals with lived experience of injection drug use and were trained on all aspects of the study protocol (Public Health Agency of Canada, 2006). Knowledge translation occurred on an ongoing basis as reports were developed for data specific to each city and each participating site. These results were shared with the sites in aggregate form to provide information on national trends in addition to site specific reports. The efforts of the research team to provide both national and local data on various factors that contribute to IDU-related risk behaviour was a reflection of both a respectful TD process and an understanding of the diverse needs of the research participants. The project honoured the pragmatic needs of the participating community harm reduction programs and recognized that “integrated knowledge translation”, a key component of a TD approach involving the ongoing sharing of study findings with stakeholders (see Chapter 9 for more information), could have a direct impact on programming. The project was truly TD as the process involved respectful partnerships

involving input and involvement of all stakeholders throughout the life of the project, and wide dissemination of findings.

Furthermore, the project facilitated significant capacity-building at the community level necessary to improve harm reduction programming provision and uptake. The SRCHC used the project's site-specific data to inform a wide range of organizational and programming decisions. The site-specific data confirmed suspicions that HIV was exceptionally low in prevalence among drug users in the community served by SRCHC and COUNTERfit. Service providers at the SRCHC were encouraged by these findings and felt that they suggested that their harm reduction program model was effective in maintaining low HIV rates. Hepatitis C virus (HCV) rates, however, were substantially higher among IDUs from all programs and all sites. The project reports stimulated mobilization and development which has led to the creation of a program that offers a unique access point to HCV education, support and treatment for illicit drug users in a community setting. This programming has filled a service gap for the drug-using population in Toronto, who have previously received limited access to HCV treatment, related education or support under the assumption that the chaotic lifestyles of drug users would contribute to low adherence to the difficult HCV treatment regimen (Edlin et al., 2001; Grebeley et al., 2007).

Data from the project also confirmed that the proportion of women accessing harm reduction programs was substantially lower than men. This informed another research project examining the specific harm reduction programming experiences of women and men with the intent to develop a specific harm reduction program for women. This project in turn led to the development of a permanent women's harm reduction program at SRCHC. Drug users continue to be involved in all aspects of the women's harm reduction program development, implementation, and evaluation. This involvement can facilitate empowerment at both individual and community levels. At the individual level, the experiences of drug users are valued and acted upon. This in turn can empower the larger community of drug users with respect to adoption of harm reduction practices through the validation of lived experience and the provision of services that are tailored to their needs.

TD research in an ideal sense should be research that is taken up and applied in policy due to the diverse partners involved in the research enterprise. It should also be equally focused on the needs of all partners. This project is illustrative of the ability of a TD team of academics, service providers, service users and policy-makers to effectively move research into practice through the quick uptake of findings into community program planning for a complex health problem. The project exemplifies the necessity of equitable participation by all stakeholders in research design, in posing relevant research questions, capacity-building within the affected community, and ongoing access to relevant data with which to make TD health research most actionable. It also demonstrates the importance of a willingness on the part of academic partners to support the needs of communities and programs and a reciprocal responsibility on the part of community partners to support meaningful access to community resources, knowledge and participants.

Recommendations for the Implementation of Empowering and Actionable TD Research for Marginalized Populations

Based on our theoretical and practical discussions, the TD research approach has many benefits and can potentially empower marginalized populations in various ways. The merging of multiple perspectives and methods in order to explore and address complicated health conditions with multiple antecedents and consequences can contribute to increased explanatory power of findings and inform the development of appropriate interventions. Based on the authors' experiences working in harm reduction service provision and/or research, we take this opportunity to make some recommendations for the production of empowering and actionable TD health research for marginalized populations:

(1) Community member knowledge is a necessary component in all stages of the TD health research process. In order to begin to effectively research and understand the complex health problems that affect marginalized populations, the harnessing of local knowledge from experts with lived experience is imperative (Roche, 2008). Furthermore, researchers need access to local populations in order to identify appropriate research questions and methods. Research partnerships must be equitable in order to facilitate working relationships between academic researchers and community members in light of power imbalances, differing agendas and potential mistrust. Furthermore, without inclusiveness, equitable community-level involvement and support for the project, it may be difficult to recruit members of the marginalized community affected, who are often difficult to reach, as research participants. In order for TD health research to problem solve for marginalized populations, capacity within the affected community must be built to use findings to raise awareness of the health problem and develop interventions to address the problem (Benoit et al., 2005). Essentially, involvement of community at all of these stages serves to increase explanatory power and the capacity for action from the research produced.

(2) As our examples have illustrated, there should be willingness to collaborate and trust among all research partners in order to facilitate the balancing of power and arrival at equitable involvement of community in all research stages. Partners should take the time to first consult with all prospective team members in order to ensure that they will be a good fit, thus contributing to the fruitfulness of the collaboration. They must also focus on building trust in order to avoid commonly reported problems in CBR of perceptions of "credentialism" and feelings of "tokenistic" involvement by community partners on the research team (Roche, 2008; Travers et al., 2008). If community partners do not feel that their experiences are valued and are only included in selected aspects of the research, this will erode the empowerment and capacity-building component of the research and diminish the research team's ability to produce actionable findings with which to improve the health of marginalized groups. Tools such as "Terms of Reference" that outline roles, responsibilities and terms of conduct

for all members of the research team can be useful to help build trust and ensure a respectful research partnership.

(3) An important part of trust building is reflexivity with respect to each partner's social position and the understanding that academic and community partners may have differing agendas with respect to the purpose and outcomes of the research (Benoit et al., 2005; Wallerstein, 1999). As exemplified in the PAR project on concurrent disorders, the research team recognized that they had differing research agendas but were open to learning from the different perspectives and knowledge each brought to the project with respect to goals and outcomes. Only if partners are aware of and willing to negotiate these differing agendas, will harm to the research and capacity-building processes be avoided.

(4) Finally, there needs to be greater clarity regarding the empowerment and capacity-building goals of TD research projects. Such clarity regarding how marginalized populations want to and will be involved in all stages of the research (e.g. will peer researchers be trained and employed to collect data, will individuals with lived experience be involved in an advisory panel informing all stages, will participatory methods be used whereby research participants generate and analyze the data and disseminate findings, or all of the above?) and how empowerment and capacity-building at the broader community level will be sustained once the research project ends, can guide the realization of empowerment goals through TD research.

The key to the production of empowering and actionable TD health research for marginalized populations lies in the level of inclusiveness of the research process. Representatives of the affected community should participate in all aspects of the research process: conceptualization, data collection, analysis, interpretation and ongoing knowledge translation. However, throughout this process the research team must be cognizant of power dynamics and the needs of all partners (Roche, 2008). Particular focus should be placed on the needs of community partners in order to ensure the relevance of the data collected with which to understand the complex health problems in their local communities. This focus will also serve to promote engagement in future research and program planning that will generate capacity building to develop solutions to the complex health problems of marginalized populations in urban settings.

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Part II
Examples of Transdisciplinary Research

Chapter 4
Reducing Health Disparities Experienced by Refugees Resettled in Urban Areas: A Community-Based Transdisciplinary Intervention Model

Jessica R. Goodkind, Ann Githinji, and Brian Isakson

> *"Social justice is a matter of life and death. It affects the way people live, their consequent chance of illness, and their risk of premature death."*
> – WHO Commission on Social Determinants of Health, 2008

There is a growing recognition that social inequities in education, housing, employment, health care, safety, resources, money, and power contribute significantly to increasing health disparities globally, within countries, and even within specific urban environments. Thus, to promote health and well-being for all people, the World Health Organization recommends improving daily living conditions, measuring and understanding problems of health inequity, assessing the impact of action to address these problems, and ensuring equitable distribution of money, power, and resources (CSDH, 2008). Among the diverse populations that bear the burden of social inequities and health disparities are the increasing numbers of refugees and immigrants settling in urban areas. These newcomers often have higher rates of distress, limited material resources, lingering physical ailments, and loss of meaningful social roles and support, all of which are often compounded by racism, xenophobia, other forms of discrimination, and marginalization of their cultural practices.

This chapter presents a case study of the Refugee Well-being Project, a transdisciplinary (TD) research effort that has the specific goal of promoting social justice and reducing health disparities experienced by refugee families in urban areas in the USA. The project involves the development, implementation, and evaluation of an innovative mental health intervention that brings together refugees and undergraduate students to engage in mutual learning and the mobilization of community resources. After describing the project, we discuss the ways in which it represents a TD research approach, our research team and design, and challenges and implications for future research.

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Refugees

There were an estimated 14 million refugees and asylum seekers at the end of 2008 (US Committee for Refugees and Immigrants, 2009, 2008). A majority of refugees remain in their country of first asylum (usually in the "developing" world) or are repatriated to the country from which they fled. Voluntary repatriation to a secure country of origin is preferred because refugees are able to reintegrate into their homeland and a culture they understand, and it simultaneously relieves the temporary host country of economic and cultural stress, thus leading to long-term stability in a region (UNHCR, 1996). Less than 1% of refugees are resettled into a third country in the "developed" world. The United States, Canada, and Australia accept the majority of refugees from this group, and thus North America fulfills an important role in resettling refugees who are unable to return home or remain in their country of asylum. The USA remains by far the largest acceptor of refugees, for example, resettling 79,900 refugees in 2009. (United Nations High Commissioner for Refugees, 2010).

Because refugees are usually survivors of numerous traumas and face many resettlement challenges, they frequently have multiple health needs that require individual attention. However, without a focus on larger social and system changes, in terms of both the living conditions and health care for refugees in their countries of resettlement and the dynamics that create ever-increasing numbers of refugees and internally displaced persons worldwide, the root causes of suffering will remain unaddressed. The result is an apparent tension in regard to the level of intervention on which to focus. For instance, psychologists might typically focus on eliminating refugees' distress through the reduction of individual barriers and problems while sociologists might seek to understand the structure of the health-care system in a particular area and how it impacts refugees' access to health care. Political scientists might work to change global policies and processes that are contributing to the creation of large numbers of displaced persons in the world, while community members might direct their efforts toward organizing and mobilizing for change around a specific local policy that impacts refugees. A TD approach recognizes the importance of all of these efforts and furthermore reveals that they are not mutually exclusive but can be addressed simultaneously within one project.

Refugee Mental Health and Well-being

Mental health cannot be understood outside of a cultural context. What is considered "normal" behavior within one culture may be indicative of mental illness in another. In addition, people from different cultures react differently to distress. For instance, somatization (psychological distress manifested as physical symptoms) is common among many non-Western cultures (Jenkins, 1996; Kirmayer, 1996). Although Western medicine attempts to separate physical and mental health, many cultures consider them inseparable and interrelated and thus take a holistic approach to health (Vontress, 2001). Additionally, Western psychology generally focuses

on the individual and locates causes of distress within the individual (Marsella & Pedersen, 2004; Summerfield, 1999). However, cultures have widely varying beliefs about causes (and therefore cures) of mental illness (Fuertes, 2004). Thus, Western individual psychotherapy cannot be assumed to be culturally appropriate for all people (Miller, 1999). Many refugees have traditional healing ceremonies and support systems from their native cultures (e.g., extended family structure, clan system, community or neighborhood support) that may be more effective (Marsella & Pedersen, 2004).

We also know that attention to the psychological needs of refugees is important but inadequate if other needs are ignored. Rather than an exclusive focus on therapy to deal with the past traumas that refugees have experienced, holistic interventions that address material, social, and educational needs and the challenges of living in a new country, as well as psychological needs, are important. This requires creative approaches and broader definitions of the appropriate roles for psychologists and others who seek to promote the mental health and well-being of refugees. To further elaborate on these issues, it is important to consider the current literature on refugee mental health.

Refugees are at high risk for mental illness because of their exposure to trauma during pre-migration (e.g., sustained warfare, death of family and friends, loss of home), migration (e.g., fleeing home under life-threatening conditions, separation, and death of family and friends), and encampment (e.g., prolonged stays in unsafe and overcrowded camps, uncertainty about future), and because of the extensive stress associated with the post-migration experiences of beginning new lives in exile (Abueg & Chun, 1996). Many studies have found that refugees in the USA experience higher rates of psychological distress than do the general population or other immigrants in the USA (Hirayama, Hirayama, & Cetingok, 1993; Williams & Westermeyer, 1986). Most of these studies have focused particularly on psychiatric symptoms such as post-traumatic stress disorder (PTSD). However, many questions have been raised about the validity of PTSD for refugees from non-Western countries. For instance, although people from various cultures may experience similar symptoms included in PTSD, they may have different values or meanings, including different ideas about what is "normal." In addition, a PTSD diagnosis focuses only on symptoms that may be clinically significant, which may ignore other aspects of individuals' and communities' experiences, including the cultural and political implications of the trauma they have experienced. An emphasis on PTSD can also distract from current and ongoing stressors faced by individuals and may result in certain assumptions about the applicability or appropriateness of individual treatment methods. Finally, the collective traumatization experienced by many refugee groups is not fully captured in the concept of PTSD, which is an individual diagnosis (Nicholl & Thompson, 2004).

Given these concerns, it is important to consider the psychological well-being of refugees more broadly. Some research has examined this by assessing multiple aspects of refugee psychological well-being, including emotional and somatic distress, demoralization, happiness, life satisfaction (Rumbaut, 1989, 1991a, 1991b,), quality of life, and cultural alienation (Birman & Tran, 2008). It is important to

consider definitions of psychological well-being that include both affective and cognitive components and that use measures that have been developed to assess a wider range of experiences rather than only clinical populations and Western-based psychiatric diagnoses.

With some notable exceptions, however, most research on refugee mental health has not only focused on the high levels of distress and clinical diagnoses such as PTSD, depression, and anxiety among refugees but also typically emphasized refugees' past traumas as the cause of these problems. As a result, treatments for refugees have usually emphasized psychotherapy and other individual-focused solutions that address the past traumas. However, recent research has demonstrated that the high levels of distress among refugees are also caused by the daily stressors they face in exile situations, including their marginal position/relative powerlessness in the new place (Miller, 1999; Rumbaut, 1991b), extensive, undesired changes to their way of life (e.g., Rumbaut, 1991b), difficulty achieving their life goals and environmental mastery in a new place (e.g., Dona & Berry, 1999), poverty and daily economic concerns about survival in a new country (e.g., McLoyd, 1990; Paltiel, 1987; Silove, Sinnerbrink, Field, Manicavasagar, & Steel, 1997), loss of community and social support (e.g., Birman & Tran, 2008; Gorst-Unsworth & Goldenberg, 1998; Sinnerbrink, Silove, Field, Steel, & Manicavasagar, 1997), loss of meaningful social roles (e.g., Lavik, Hauff, Skrondal, & Solberg, 1996), and racism and discrimination (e.g., Silove et al., 1997). These post-migration stressors are particularly burdensome for refugees whose culture, skills, and experiences are vastly different from the predominant culture, language, and work opportunities in the United States.

Therefore, it is important to consider refugee mental health and its promotion from a holistic perspective that recognizes the traumatic circumstances most refugees have had to endure prior to their resettlement while also focusing on the difficulties refugees face in their daily lives in their country of resettlement. In addition, efforts to promote refugee well-being must be culturally relevant to refugees and should build upon their strengths and the resources in their communities. Based on these realities, the goal of the Refugee Well-being Project is to promote the mental health and well-being of refugees by involving undergraduates and refugees in mutual learning and advocacy. Rather than emphasizing only what newcomers to the United States needed to learn to survive here, this project focuses on mutual learning through which refugees and undergraduates both learn and share. Through this process, refugees' experiences and knowledge can be valued and their identities can be validated.

Refugee Well-being Project: Project Description

The primary objectives of the Refugee Well-being Project (RWP) are to reduce health disparities experienced by refugees by (1) improving access to community resources and communities' responsiveness to refugees; (2) promoting and preserving refugees' cultures and valued social roles; (3) increasing English proficiency

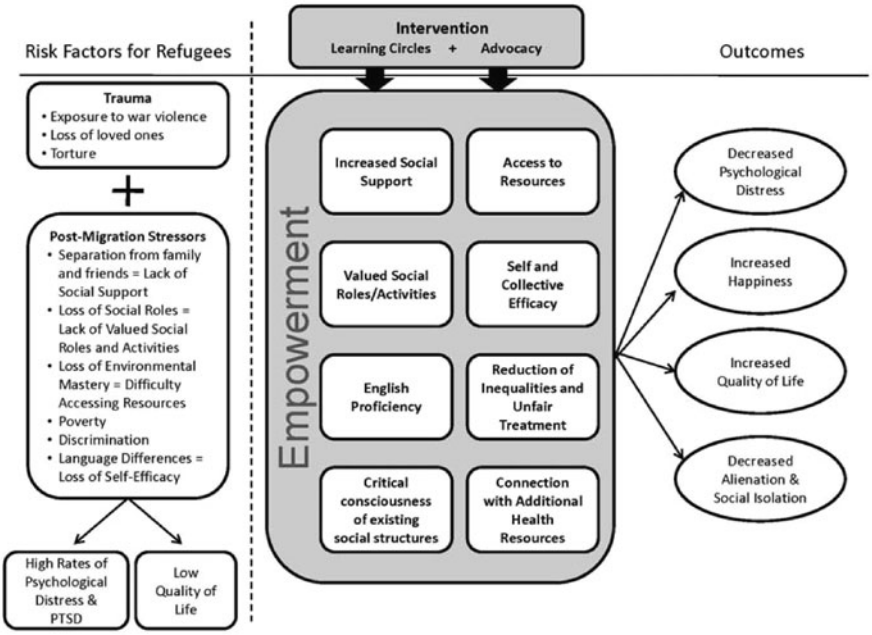

Fig. 4.1 Conceptual model

and literacy; (4) improving intergenerational respect and communication; and (5) enhancing refugees' empowerment and integration in their communities (see Fig. 4.1). The objectives of RWP are achieved through implementation of a 6-month program that has two major components: *learning circles*, which involve cultural exchange and one-on-one learning opportunities for refugee families and undergraduate students, and an *advocacy component* which involves undergraduates advocating for and transferring advocacy skills to refugee families to increase their access to resources in their communities. Refugee participants and undergraduates work together for 6–8 hour per week for 6 months.

Learning circles: Learning circles occur twice weekly. Each meeting is 2 hours and involves refugee adults and children and undergraduate students. Learning circles begin with cultural exchange, which provides a forum for refugees and undergraduates to learn from each other through discussions aided by interpreters. Cultural exchange is facilitated together by one undergraduate and one refugee each evening, and involves discussion of a topic agreed upon and developed by the undergraduate and refugee partners. Cultural exchange discussion topics have included the following: methods for disciplining children, health care, safety issues, labor unions and worker rights, roles of men and women in the USA, Martin Luther King Jr. and the treatment of Black people in America, and performance arts including music, drumming, and dancing. The second component of the learning circles is one-on-one learning, during which time undergraduates and refugee participants work in pairs. Refugee participants choose their areas of learning such as speaking,

reading and writing English, and completing job applications. Child and adolescent activities include homework help, tutoring, and other fun learning activities. A sound relationship between the teacher and the learner is an essential aspect of effective learning. To ensure the development of such relationships, each refugee participant studies with the same undergraduate each time, thus fostering the development of comfort and trust. Undergraduates are also engaged in learning as they learn about the culture, experiences, and knowledge of refugee participants. The learning circle structure provides important flexibility to tailor the meeting to the interests and needs of each group.

Advocacy: The advocacy component of the program is based on the community advocacy model, which has also been successfully applied to women and children who have experienced domestic violence (Sullivan & Bybee, 1999) and to juvenile offenders (Davidson, Redner, Blakely, Mitchell, & Emshoff, 1987). These advocacy projects are predicated on research that demonstrates that access to community resources is fundamental to promoting the well-being of disenfranchised individuals. Once relationships have begun to form between refugees and undergraduates, each student is matched with the one or two refugees with whom they work in the learning circles to serve as an advocate for them. The undergraduates spend an additional 2–4 hours each week (outside of the learning circles) with their refugee partners to provide advocacy to mobilize community resources based on unmet needs identified by the partner. The emphasis of advocacy is on transferring the advocacy skills to the refugee families so that their increased access to resources and self-sufficiency is sustained after their involvement in the program ends. Example areas of advocacy include *health* (e.g., accessing and utilizing health care and providing cultural "interpretation"); *housing* (e.g., finding affordable housing, locating household items); *school* (e.g., working with educators and refugee families to monitor student progress and improve students' attendance); and *other resources* (e.g., helping families access cheap or free clothing, food, and diapers; assisting in immigration and residency issues; helping connect families with free tax services).

It is important to note that the learning and the advocacy are two inextricable parts of one holistic program. The RWP is centered around the learning circles, which provide participants with opportunities to discuss their advocacy efforts, share ideas and resources, and get assistance from the interpreters. Besides emphasizing what refugees need to learn to survive in the USA, the program also focuses on mutual learning, whereby refugees both learn from and teach Americans. Through this process, refugees' culture, experiences, and knowledge are valued and utilized in the promotion of their well-being. By design, the program has the potential to incorporate the strengths and needs of refugees while addressing multiple aspects of the empowerment process (Parsons, Gutierrez, & Cox, 1998): (1) building skills and knowledge for critical thinking and action (e.g., English proficiency, advocacy skills); (2) changing attitudes and beliefs (e.g., value of own culture and knowledge, increased self-efficacy); (3) validating through collective experiences; and (4) securing real increases in resources and power through action and system-based advocacy. In addition to addressing the social determinants of health, the

learning circles and advocacy also focus directly on connecting refugees to health resources (including physical health, mental health, dental, and optical care) and on improving refugees' health through cultural exchange discussion topics on dental hygiene, sexual health, prenatal care, and how to use health-care systems in the USA.

Development of the Project

The idea for the Refugee Well-being Project was initially conceived by the first author and Hmong[1] community members in Lansing, Michigan. We worked together to conduct several studies. First, we focused on Hmong refugees living in three public housing developments. We wanted to understand why Hmong families were not accessing resources from community centers that were 100 feet from their homes and did not feel they were able to participate in, or had anything to contribute to, their communities. Their marginalization and inability to make use of the resources in their social environments were evident. This lack of understanding and ability to navigate the system, the accompanying feelings of powerlessness, and a lack of access to resources seemed to be some of the most fundamental and important exile-related stressors facing these Hmong refugees. Quantitative and qualitative interviews revealed that only practical barriers (e.g., language, lack of child care) and discrimination were related to non-participation and that, in turn, participation was positively related to psychological well-being. We concluded that social contexts needed to be created which address issues of discrimination and exclusion and which enable refugees to develop the abilities and skills necessary for them to meaningfully participate in their communities and access resources (Goodkind & Foster-Fishman, 2002).

The findings from this study formed the basis for our next study, which was the first author's dissertation. We had the dual goals of developing and evaluating the intervention (described previously) designed to enhance refugees' psychological well-being by creating change at multiple levels and of furthering our understanding of these change processes. The study involved 28 Hmong adults and 27 undergraduate students. Using a mixed-method, longitudinal design, we found significant increases in English proficiency, access to resources, quality of life, and knowledge of US history and government (needed to become a US citizen), as well as significant decreases in psychological distress among refugee participants (Goodkind, 2005). Other outcomes that were supported by our qualitative data included increased valuing of participants' knowledge and experience, validation of participants' ethnic identities, appreciation of the strength and resiliency of refugees, recognition of society's responsibility in the process of refugee resettlement and the need for system-level change, and increases in participants' environmental mastery and self-confidence (Goodkind, 2006).

[1] Hmong people are an ethnic group in China and Southeast Asia.

Although the study was originally time-limited (both because it was the first author's dissertation and more importantly because it was essential to examine the effects of the intervention before establishing it as an ongoing project), several impacts and changes were sustained following the 6-month intervention (for more details, see Goodkind, Hang, & Yang, 2004). Unfortunately, there was not enough time to help create a sustainable model in Lansing that was run by the Hmong community in partnership with others. However, we felt it was important to continue this work in other urban areas with large immigrant and refugee populations. Therefore, when the first author assumed a faculty position at the University of New Mexico, she began talking with refugee community members and service providers in Albuquerque about the issues they were facing, and she shared with them the model she had developed with Hmong refugees.

After initial qualitative background research with refugees and providers, we initiated the second phase of the Refugee Well-being Project in August 2006 with African refugee families. Between 2002 and 2007, 1,226 refugees were resettled in New Mexico. Of this number, 160 (13%) were Africans from the countries of Burundi, Cameroon, Congo, Eritrea, Ethiopia, Liberia, Somalia, Sudan, and Togo. In New Mexico, African refugees represent a high need, underserved population. Most families are single mothers with multiple children. Many have witnessed or experienced torture. Additionally, most health-care providers are unaware of their cultural backgrounds and experiences. In addition to working collaboratively with the African refugee community to address their mental health and well-being, we also thought it was important to test the applicability of the model to other communities, contexts, and cultures. Working together, we adapted the model in several ways. First, all research team members wanted to broaden the model to include children and adolescents. This was based on a mutual recognition of the unmet needs of refugee children, the intergenerational conflicts many families were experiencing, and the impact of both of these on families' health and well-being. We also saw the potential for the learning circles to be a setting where refugee children could learn about their traditional cultures from their parents and parents could learn from their children about their experiences in school and the issues that were important to them.

The Refugee Well-being Project has completed its third year in operation in Albuquerque and has involved a total of 83 African refugees (46 African refugee children and 37 adults) and 54 UNM undergraduate students. We have had a waiting list of refugee families each year because so many want to participate and attendance at the learning circles is extremely consistent. Our process, fidelity, and qualitative data suggest that the program has positive effects on participants' mental health, access to resources, quality of life, social support, and English proficiency. In addition, refugees reported that they felt welcomed and accepted in the USA, refugee children made important academic progress and became integrated in recreational activities, and refugee adults had improved employment opportunities. We are in the process of analyzing our quantitative data from the first 2 years of the project.

The TD Approach of the Refugee Well-being Project

The Refugee Well-being Project evolved through long-term relationships and collaboration among university and community partners. We began with a fundamental belief that all people have knowledge and expertise that they can use to solve their problems. We based our efforts on several other guiding principles, including the importance of (1) locating problems beyond the level of the individual, (2) viewing diversity as a strength, not deviance, and (3) developing an empirical base for social action. To adhere to these principles and to achieve sustainable change that supports the well-being of refugees and other newcomers, we employed several strategies: (a) creating alternative settings and social roles; (b) recognizing people as experts on their well-being and healing; (c) building on individual, family, and community strengths; (d) facilitating critical awareness and collective action; (e) developing and connecting people with local resources and infrastructure; and (f) advocating for more just policies and laws. We also recognized that addressing the issues faced by newcomers in urban areas requires emphasis on multiple domains or life areas, including psychological, physical, educational, cultural, social, and material. Thus, a unidisciplinary perspective would be inadequate. Transdisciplinarity, as defined and applied in our study, has involved the following:

- A focus on social determinants of health and social justice
- Collaboration among researchers and non-academic groups
- Inclusion of both scientific and non-scientific knowledge (e.g., one of fundamental tenants of the program is mutual learning and the importance of the knowledge, experience, and expertise that newcomers possess)
- Integration of knowledge from multiple academic disciplines, including community psychology, clinical psychology, anthropology, social work, and education
- Explicit research goals that include knowledge generation, social change, and empowerment of all participants
- Open discussion of process as well as outcomes
- An ecological model that integrates multiple levels of analysis
- Integration of health and social sciences methods and methodologies
- Involvement of students to foster intergenerational transfer of knowledge
- Advocacy training to transfer skills to students and refugee families in order to contribute to sustainable change

The Refugee Well-being Project works towards social justice in several ways. One primary mechanism is through its approach to education and learning. Newcomers to the United States often need to acquire new skills and knowledge such as English proficiency; knowledge about political, social, and economic processes; literacy; and job skills. This type of learning is termed instrumental learning and is an important aspect of empowering individuals because it enables them to acquire the skills and knowledge they need to participate in their communities

(Zimmerman, 1995). Learning English is also important because English proficiency is an essential resource for the economic and social adaptation of immigrants and refugees (Rumbaut, 1989) and is negatively related to depression, anxiety, and other mental health problems among refugees (Rumbaut, 1989; Westermeyer, Neider, & Callies, 1989). Moreover, learning can further empower disenfranchised individuals and communities by raising their consciousness, increasing their understanding of the structural forces affecting them, and providing mechanisms through which they can work collectively for social justice. This type of learning is also referred to as popular education (Cunningham, 1992) or transformative learning (Cunningham, 1998) and places individuals and their experiences in the center of their own learning, as subjects (rather than objects) of their learning (Freire, 1998). The popular education perspective argues that individuals are shaped by their context, including their social location, and therefore it focuses on transforming social structures in order to achieve a more just society.

The work of social worker Jane Addams and her colleagues is also fundamental to an understanding of adult/popular education for refugees and immigrants and the educational component of the intervention. Jane Addams formed one of the first settlement houses in Chicago because she felt that all community members must share responsibility for immigrants' well-being. Her actions were predicated on several beliefs, including the interdependence of all human beings and the importance of education as the basis of social change and the vehicle through which immigrants could contribute their unique abilities, skills, and vision to their communities. She believed that education must begin from the experiences of the learners but must also help learners to see their place in the larger world (Addams, 1964). It is important to note that popular education and Freire's and Addams' approaches to learning are intimately linked to the processes of community participation, empowerment, and access to resources. They recognize education as a social as well as an individual act (Cunningham, 1998) and they problematize a sole focus on individual learning without accompanying change in social structures or mobilization of resources.

Furthermore, the RWP provides a unique service learning opportunity for undergraduate students through which they are able to apply their academic skills and knowledge to benefit their community and work towards social change. Undergraduates enroll in a two-semester upper-division psychology/anthropology course. They receive intensive training and preparation during the first 3 months. For the final 5 months of the program, training is replaced by weekly supervision. This educational experience raises awareness among undergraduates of the need for social change and methods for working towards creating a more just society.

The Refugee Well-being Project was designed to enable participants to take greater control over their lives by providing mechanisms through which they could define and solve their own problems rather than rely on outside "experts." Gaventa (1995) points out both external barriers (e.g., lack of organization, lack of voice in community, limited funds to influence politics) and internal barriers (e.g., lack of critical consciousness, lack of understanding of possibilities for social change), which exclude many disenfranchised people from meaningful participation in their communities. Thus, effective participation and real gains in power require both

community organizing in order to bring a group together and to establish a power base and popular education in order to enable individuals to transform how they think about themselves and their place in the world (Gordon, 1998). This project addresses both of these components by offering opportunities for transformative learning in the learning circles and for community organization through both cultural exchange and the mobilization of community resources.

Research Design and Research Team

Our commitment to social action is matched by an equal dedication to rigorous research that measures the intended impacts and any potential unintended consequences of our efforts. Our current research team includes a community psychologist, a clinical psychologist, an anthropologist, four former and current undergraduate students who were previously involved as student advocates in the project, and three Africans who were previously involved as refugee participants in the project. Our study employs a within-group longitudinal design with four data collection points over a period of 9 months. Participants in the intervention are assessed using a quantitative interview protocol: pre-intervention, midway through the intervention, post-intervention, and at a 3-month follow-up. In addition, participants participate in two open-ended qualitative interviews: one when they are initially recruited into the study and one when the intervention ends. These qualitative interviews allow for in-depth understanding of participants' experiences and help support and explain quantitative data. A longitudinal design allows us to examine the processes at work in the intervention and to explore potential modifiers, such as characteristics of participants who are impacted differently by the intervention.

Although a true experimental design might appear to be an ideal method to test the efficacy of the intervention, our research team recognizes that this type of design is not feasible for several reasons. First, as opposed to a large, unacquainted population, the African refugee community in Albuquerque is relatively small and members are well aware of events affecting each other. Therefore, it would be culturally inappropriate to offer some refugees the opportunity to participate while excluding others. Also, it is likely that participants who were assigned to an experimental group but had relatives in a control group might decline to participate or, if they did participate, might share the intervention with their relatives. Quasi-experimental designs are often the best designs for certain studies, given resource, practical, and logistical constraints. Rather than a simple pre-/post-design, this study employs a longitudinal design with multiple time points which allows for more thorough examination and elimination of some potential threats to validity such as maturation, history, testing, attrition, and implementation fidelity. In addition, we include concrete measures of knowledge and skills, which are important because they are unlikely to be affected by participants' potential desires to give increasingly positive responses due to the attention they received.

A TD approach has been essential but not without challenges. Because the project was originally conceived within a community psychology framework, which is a field that explicitly values and incorporates different disciplinary perspectives, there was an initial expectation for and underlying openness to an approach that integrated strengths from multiple disciplines. Furthermore, because our research team members are all in the beginning stages of their careers and/or part of a research project for the first time, we may have been less bound to particular disciplinary perspectives. However, we certainly had to devote significant time to examining our disciplinary assumptions and sharing our perspectives with each other. For instance, the non-scientist members of our research team have emphasized the lack of feasibility and acceptability of a randomized experimental design and the importance of including qualitative methodologies so that we can represent participants' experiences in their own words. These important contributions required other members of the research team to be open to combining methods and methodologies and thinking creatively about research designs. Perhaps our largest challenge has been obtaining acceptance and funding within our university's School of Medicine, many members of whom have tended to view our study as non-scientific, less rigorous, unlikely to be funded by extramural funding sources, and/or outside of the realm of traditional biomedical research that typically occurs in schools of medicine.

Discussion

The Refugee Well-being Project is in its fourth year. A total of 111 refugees and 81 undergraduate students have participated in the program. Our research team continues to grow as former participants (both refugees and undergraduates) become facilitators, research coordinators, interviewers, and co-investigators. Furthermore, we have been successful in developing a preliminary body of evidence demonstrating the positive effects of the project. In addition, we have initiated efforts to disseminate our model to research teams in Arizona, California, Illinois, Oregon, and Ontario, Canada.

Taken together, these accomplishments are encouraging. However, we believe it is also important to note our limitations and challenges. Our primary concern involves the short intervention period and the degree to which we have been able to achieve long-term, sustainable change. Our observations and qualitative and quantitative interview data suggest that the types of processes that are occurring, the skills and knowledge we are trying to help participants build, and the social change efforts we are engaged in collaboratively require longer periods of time. Empowerment is a process that takes time and that must include real and enduring increases in power and resources (Speer & Hughey, 1995). We have seen some evidence that this has occurred in our communities. However, we believe that the full potential of our research has not yet been achieved because we have not resolved issues of sustainability. We envision an ongoing project involving learning circles and advocacy in which community members participate as long as they would like. We are considering how this type of endeavor can be sustained and institutionalized within

refugees' communities. An ongoing partnership between universities and refugee communities and organizations in which undergraduates make a two-semester commitment and refugee community members participate as long as they want is our ideal. As such a project grows and social and material resources within our communities develop, coordination and ownership can be increasingly shifted to the refugee communities. However, many refugee communities have so few resources that it takes time to reach this ultimate goal. Our research demonstrates that universities possess untapped resources that have great potential for improving the well-being of refugees and that undergraduates can be effective change agents and engage in relationships with refugees that are mutually beneficial. Therefore, we think this research and intervention model has great potential for contributing to reduction of health disparities in urban communities and to sustainable change.

Together, our research team has worked to address urban health problems by creating change at multiple levels. We have attempted to measure change at these different levels by assessing individual psychological well-being and quality of life as well as changes in our community's responsiveness to the needs of newcomers. However, some of the important changes that are fundamental to improving our urban settings are best expressed by participants.For example, the words of a 37-year-old man from Burundi:

> When I was leaving Africa some of our friends were like, "Well, you're going to a foreign country, you're going to live in your house, nobody is going to come say hello, there are no black people there from Africa, you'll live all by yourself." . . . As refugees, we receive so much food, and clothing, and shoes, but then would these white people, are they going to accept food and water from us? And so you guys [undergraduate students] came in and you were eating with us and hanging out with us, and we were completely in shock, and we were so amazed that a whole group of white people would come to our house, and our friends find it difficult to believe that such a thing happened. A lot of people are really shocked that this has happened. So our friends in Tanzania are asking, "So the American people, do they really come up and say hello to you, do they greet you and hang out with you?" And we say, "Oh yeah, they do! And they're our friends, and we hang out," and they're like, "Well then America is a good country".

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Chapter 5
The Street Health Report 2007: Community-Based Research for Social Change

Erika Khandor and Kate Mason

Homelessness is a devastating social issue that affects a large number of people in Toronto, Canada's largest city. According to a survey conducted by the City of Toronto, a minimum of 5,052 individuals were estimated to be literally homeless on one night in April 2006 (City of Toronto, 2006), and in 2007, at least 24,868 individuals stayed in a Toronto shelter at least once (City of Toronto, 2008).

Street Health is a community-based health-care organization in Toronto that began in 1986, when a group of homeless people identified barriers to accessing health care and a group of volunteer nurses responded by providing nursing services at local drop-ins. Street Health has since expanded to provide a range of programs and services for homeless and marginalized people in Toronto, including nursing care, mental health support, street outreach, harm reduction, HIV/AIDS prevention, hepatitis C support, identification replacement and storage, and peer capacity building. In addition to its frontline services, Street Health engages in research and advocacy that aims to address the root causes of homelessness and achieve social change.

Street Health has long recognized the need to collect data and conduct research in order to both strengthen and inform its frontline services and to establish a sound evidence base upon which to ground its advocacy efforts. Street Health has a strong history of engaging in research partnerships and conducting community-based research on topics of importance to the homeless community. This work began in 1992 when Street Health published *The Street Health Report* (Ambrosio, Baker, Crowe, & Hardill, 1992; Crowe & Hardill, 1993), the first comprehensive study in Canada to explore the health status of homeless people and their ability to access the health-care system. More recent examples include the *Integrating Community Based Research* project (Wood, 2004), which explored the research interests of homeless people and people at risk of homelessness, and the *Failing the Homeless* project (Street Health, 2006), a research study that identified the barriers to provincial disability benefits for homeless people.

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In 2006/2007, Street Health undertook a transdisciplinary (TD), community-based research project on the health status and access to health care of homeless people in Toronto. As discussed in Chapter 3, This case study illustrates how community-based participatory research overlaps with the principles of a TD research approach. The 2006/2007 project was a follow-up to the 1992 *Street Health Report* mentioned earlier. The 1992 study documented how a range of specific medical problems are particularly prevalent among the homeless population, including seizures, chronic obstructive pulmonary disease, arthritis, and other musculoskeletal disorders; the report also identified many barriers to accessing health care. The 1992 *Street Health Report* was an important resource for academic and community stakeholders and played an instrumental role in bringing homelessness and its impacts to the attention of policy-makers and the general public. The report made over 40 recommendations to a variety of government departments and programs at all levels, in both the health and social sectors. Several of the recommendations were ultimately implemented, resulting in improved conditions for homeless people. One of the barriers to health care documented in the 1992 *Street Health Report* was the difficulty that homeless people have in applying for, and maintaining, government identification such as health cards that facilitate access to universal health care. As a result of Street Health's research findings and subsequent advocacy efforts, special community programs and government protocols were developed for homeless people to help them access identification. Consequently, more homeless people are now able to successfully access health and social services.

In the years between the publication of the 1992 *Street Health Report* and our 2007 study, important social and political changes occurred across Canada and new health issues emerged within the homeless community. Government cutbacks to social programs like welfare and disability benefits, as well as new health issues and disease outbreaks (e.g., HIV, hepatitis B and C, tuberculosis) in Toronto, had a dramatic and disproportionate impact on the health of homeless people. At the same time, little comprehensive research on the health status of homeless people in Canada had been published by other community-based, government, or academic researchers.

The Street Health Report 2007 was conducted to fill a gap in knowledge about the current health status of homeless people in Toronto and was based on an understanding of the social determinants of health and grounded in the experiences of homeless people and the agencies that work on their behalf. In addition to providing valuable and otherwise unavailable information to inform practice and programs, a major goal of this study was to provide evidence to strengthen advocacy efforts by Street Health and other community groups addressing the root causes of homelessness and poverty. As such, a central focus of this study was the development of concrete policy recommendations and an active dissemination and advocacy strategy.

This chapter provides a description of our research approach, partnerships and community involvement, research methods and key findings, knowledge translation activities, and the impact of *The Street Health Report 2007* study. It further discusses how transdisciplinarity was applied and explores the overlap between community-based and TD research, as well as the challenges and benefits of these approaches.

The Street Health Report 2007

The Street Health Report 2007 was based on the principles of community-based research, but also incorporated and illustrated many of the principles and goals of TD research. Community-based research is a collaborative approach to research that equitably involves non-academic researchers such as community members and organizational representatives in all aspects of the research process and aims to create knowledge that informs interventions or policy to improve the health and well-being of the community (Israel, Eng, Schulz, & Parker, 2005). Core principles that are common to many community-based research projects include building on the strengths and resources within communities in order to address identified concerns, an equitable partnership in all phases of research through shared decision-making and control, a reciprocal exchange of knowledge and skills, and an emphasis on broad dissemination (Israel et al., 2005). Community-based and TD research share many common elements which were reflected in our project. For example, our study utilized a research team that was made up of a variety of equally important stakeholders including community members directly affected by homelessness; an integration of various perspectives, disciplines, and methods; an evolving and responsive research process; and a commitment to knowledge exchange and social change such that answering the research questions was only the beginning of our research process (Ramadier, 2004; Smith, 2007; Wickson, Carew, & Russell, 2006).

Traditional academic studies and publications on homelessness are often narrowly focused on the examination of a specific causal pathway, isolated health issue, or particular sub-population (see Fischer & Breakey, 1991; Roy, Boivin, Haley, & Lemire, 1998). Academic research also takes a considerable length of time from concept to publication. In addition, the language and style used in academic publications, coupled with the limited reach of the journals themselves, makes most academic research inaccessible to non-academics. Although academic articles may allude to the policy implications of study findings, most publications do not make targeted and actionable policy recommendations. In contrast, Street Health wanted to create comprehensive and current evidence that would be perceived as timely and relevant by policy- and decision-makers. We had a strong desire to publish research findings that were easy for a broad range of stakeholders to understand and use and to offer specific policy and program solutions that directly addressed the issues documented by the study.

Street Health approaches research in the same way that it understands and organizes all of the services it provides – with a concern for social context, a respect for multiple perspectives and forms of expertise, in collaboration with other service providers and stakeholders, and with a very pragmatic and solution-focused approach. *The Street Health Report 2007* applied a TD approach not for the purpose of developing a new methodology or way of understanding homelessness, but primarily as a way of ensuring that the knowledge generated would be both rigorous and valid while at the same time being relevant to the community and for policy-makers.

Partnerships and Community Involvement

Involving a range of diverse stakeholders throughout the entire research process was both an important aim and a necessary component of our study. This was accomplished through the use of a peer researcher model, an advisory committee, extensive collaboration with key partners, and broad consultation with other relevant stakeholders.

Our study made considerable efforts to actively involve the community being studied in each stage of the research process. One of the primary ways that this was accomplished was through the use of a peer researcher model whereby a group of 15 people with past or current lived experience of homelessness advised on the research design, conducted interviews, assisted with data analysis, shaped report messages, spoke publicly on the findings, and conducted media interviews. Peer researchers were provided with five half-day training sessions and weekly support and coordination meetings throughout the data collection process. The team conducted most of the 368 interviews and participated in two half-day data analysis sessions. For a year and a half following the release of the report, the majority of the peer researchers continued to participate in the ongoing analysis and dissemination of study findings through a peer advisory committee that met on a monthly basis.

The project was also guided by an advisory committee consisting of representatives from community organizations (including frontline staff, managers, and community-based researchers), academic researchers, and people with lived experience of homelessness. This committee had extensive input in all aspects of the research process from prioritizing focus areas and providing input to the study design to participating in data analysis, developing recommendations, and directing dissemination and advocacy activities. In the study's initial phase, for a period of approximately 4 months, the community advisory committee participated in bi-weekly half-day meetings to provide input to the study design and survey instrument. Multiple smaller meetings between individual members of the committee and the study coordinators also took place during this period to work out specific aspects of the study design and logistics. The advisory committee met less frequently during data collection, but individual advisory members continued to support and provide input to the study on an ongoing basis as needed. For example, members of the community advisory committee conducted training sessions for peer researchers on topics in which Street Health lacked expertise. The advisory committee attended two half-day data analysis sessions with the peer researchers and Street Health staff to identify key findings and develop key messages. During the report writing phase, advisory committee members gave feedback on report drafts through a mix of group and individual meetings with study coordinators as well as by e-mail.

In addition to serving on the advisory committee, a smaller number of key individuals and their affiliated organizations worked closely with the study coordinators to provide additional assistance and in-kind support. The Wellesley Institute, a research and policy organization in Toronto that focuses on urban health issues, was a major funder of the study, and several of the Institute's staff provided extensive support on policy development, dissemination, and advocacy strategies. Staff

at the Centre for Research on Inner City Health (CRICH), a research institute at St. Michael's Hospital in Toronto, provided significant support, training, and guidance throughout the research design, implementation, and data analysis. For example, a research scientist at CRICH acted as the study's principal investigator so that our study would have access to the hospital's research ethics board. A CRICH research coordinator provided training and support to the study coordinators throughout the data entry process and also coordinated and helped train volunteers to assist with data entry and provided needed office space and computers.

Another key study partner was the National Film Board of Canada's Filmmaker-in-Residence (FIR) Project, a collaborative media initiative. The FIR project was based at St. Michael's Hospital and was able to partner with Street Health because of our partnership with CRICH. FIR approached Street Health, just as our study design was being finalized, to explore the possibility of using FIR's media skills and resources to support our study. Together, Street Health and FIR decided to create a series of knowledge dissemination tools designed to enhance the impact of the quantitative data. To this end, we added a qualitative study component consisting of a series of open-ended interviews and portrait photography sessions with a subsample of 28 survey participants. These interviews focused on personal experiences of health and homelessness and were conducted by a group of young women with lived experience of homelessness who had been involved in a separate FIR project. FIR then consulted with Street Health to create a series of dissemination tools that combined the personal images and stories of survey participants with the report statistics.

Overall, our research team, which consisted of the peer researchers, the advisory committee, and key partners described above, included a wide range of expertise, professional backgrounds, academic training, and a variety of disciplines that included nursing, medicine, social work, health promotion, public health, epidemiology, health services research, geography, political science, public policy, anthropology, business administration, quantitative and qualitative research, participatory media, frontline service provision, as well as personal experiences of homelessness. In some cases, individual team members brought multiple perspectives and areas of expertise. For example, one member of our advisory committee was a nurse practitioner and long-time street nurse working with homeless people at a local community health center who had played a key role in the 1992 *Street Health Report* study. Through the advisory committee, she provided a combination of frontline and research insight into key health issues facing homeless people from both a current and a historical perspective.

For the most part, the composition of the research team began with a shared conceptual framework and did not require a deliberate process whereby all of the various team members agreed to a fusion of disciplines and perspectives to carry out the study (Stokols, 2006). With few exceptions, Street Health partnered with agencies and individuals who already shared some common advocacy goals and ways of understanding issues around homelessness, health, and poverty. Additional team members were asked to be part of the study because they were willing to support Street Health's research agenda and because they filled a gap in the agency's

capacity to carry out some component of the project. Many of the research team members were interested in working on this project because they were already directly involved in research, advocacy, and service provision on homelessness and health issues. Other team members who were not directly involved in homelessness and housing issues were drawn to the project because they were involved in research and advocacy on broader social justice issues and saw this project as an opportunity to contribute to a larger agenda addressing poverty and equity issues. What resulted was a fluid and very large group of individuals of different disciplines, experiences, and expertise who helped inform and contribute to the research process and its outcomes in a variety of ways at differing stages.

Involving a range of stakeholders with varied expertise and perspectives added substantially to the quality and relevance of the study. Partnership and collaboration were a priority for this study not only for philosophical reasons but also out of practical necessity. Our decision to use a peer researcher model was a natural extension of Street Health's mandate to involve and represent the homeless and low-income community in our decision-making and activities and reflected a growing recognition of the benefits of a participatory research process in which the community of study is involved in the research process itself. Using a peer researcher model had many benefits for the project. Peer involvement added to the quality of our data because survey participants often felt more comfortable talking to people who shared similar life experiences. Further, peer involvement in data analysis enhanced the study's relevance to the homeless community by grounding it in the perspectives and priorities of individuals who have experienced the issues first hand. In an evaluation of our peer researcher model, peers reported that their involvement in the study had a strong positive impact on them as individuals, including increasing their self-confidence, acquiring skills and meaningful work experience, and gaining new insight into homelessness and poverty (Gardner, 2007).

Having an advisory committee allowed for input from different community and academic stakeholders while also providing us with access to needed expertise. As a small community-based agency, Street Health had specific research needs that could not be met within the organization. For example, our staff lacked the specialized expertise necessary to conduct a comprehensive, rigorous, and policy-relevant study. Gaps in knowledge, particularly around survey design, quantitative data analysis, and policy development, meant that Street Health required additional capacity from external partners in order to conduct the research study. Our partnership with the Centre for Research on Inner City Health ensured that we produced a scientifically rigorous and sound study, and partnering with the Wellesley Institute assured that our policy recommendations and advocacy efforts were relevant and strategic. The National Film Board's Filmmaker-in-Residence Project gave us access to creativity and resources that enhanced the impact and scope of our study through a series of dissemination tools that would not have been produced without this partnership. In addition to our research team, we also consulted with a wider range of organizations and individuals with expertise on specific issues to help us analyze aspects of our data and develop relevant policy recommendations. This approach helped ensure that our research was relevant to a variety of stakeholders and that

our policy recommendations supported those already championed by other advocates, thereby contributing to broader efforts addressing homelessness and poverty issues.

While our project benefited tremendously from these partnerships, involving multiple stakeholders in a meaningful way was also both time consuming and required additional material resources. Specifically, extensive staff time was required to coordinate the large and diverse research team at various stages of the research study and in varying capacities. This was particularly challenging for us due to the nature of community-based research funding in Canada, where the few grants that are available are typically small and of short term. Significant time was required to support the peer interviewers as a group and on an individual basis, particularly during the data collection phase of the project. Several peer researchers required assistance with issues unrelated to the study itself, from personal support to letters of reference, throughout the course of the project. Conducting the qualitative component of the study with the National Film Board's Filmmaker-in-Residence added an additional and originally unanticipated layer of staff coordination. Working within the structure and culture of a media organization that had its own distinct expectations and goals required a good deal of negotiation and additional coordination. Throughout the research process, incorporating input from the advisory committee and other stakeholders required extensive consultation and deliberation around differences in opinion that took time and were difficult to coordinate. Two full-time researchers (the chapter authors), who were employees of Street Health, were ultimately responsible for carrying the project forward and completing the bulk of the work at each stage of the research process. While the project was highly participatory and inclusive on many levels, the vision for the project came from the executive director and responsibility for final decision-making resided internally at Street Health.

Research Methods and Findings

Over a 3-month period between November 2006 and February 2007, a representative random sample of 368 homeless adults was surveyed about their health status and access to health care. The survey consisted primarily of closed-ended quantitative questions on demographic factors, health and well-being, health determinants, lifestyle factors, and access to health care and social services. Homelessness was defined as having stayed in a shelter, outdoors or in a public space, or with a friend or relative for 10 or more days in the 30 days prior to being surveyed. Study participants were surveyed at 26 meal programs and shelters across Toronto. These sites were stratified by type of service, gender served, size, and geographic area and were randomly selected.

Overall, our study found that homeless people in Toronto have significantly worse health than the general population and face major barriers to health care. The study also concluded that (1) homelessness is generally not a short-term crisis, (2) people become homeless and stay homeless largely because of poverty, and

(3) the health of homeless people in Toronto and their access to health care has worsened in the 15 years since the last Street Health study.

As previously noted, our study built on the methodology developed for the 1992 *Street Health Report*, which also used a TD approach in that it was led by a team of nurses and conducted in collaboration with academic researchers representing a range of disciplines. In order to ensure comparable findings, the 1992 *Street Health Report* methodology was replicated wherever possible. For example, we used similar sample sizes, eligibility criteria, recruitment methods, data collection time frames, geographic boundaries, and ratio of shelter to non-shelter users. Both studies over-sampled women to ensure that they made up at least one-quarter of the total sample. Many questions from the 1992 survey were also used in the 2007 study; however, the survey instrument underwent significant revision in order to capture new health issues and to ensure that findings would be comparable to general population health data gathered in government surveys. Our recruitment methods were updated and modified slightly to reflect the proliferation and specialization of services for homeless people in Toronto since the original study. A more substantial change from the 1992 study was our decision to employ a team of people with lived experience of homelessness to conduct the data collection and act as study advisors. The 1992 study had hired people working within homeless services, students, and others through a broad recruitment process for the purpose of data collection.

Knowledge Translation and Study Impact

Knowledge translation and advocacy activities were a major goal of this study and as such were an integral and important consideration throughout the entire research process. This was achieved through the creation of a comprehensive plain language report, short research bulletins, and a series of audio-visual tools, accompanied by an active dissemination and advocacy strategy.

A cornerstone for our knowledge translation efforts was the publication of our findings in a clear and comprehensive report that would be accessible and useful to a wide variety of audiences. *The Street Health Report 2007* (Khandor & Mason, 2007) presents findings on the root causes of homelessness, the daily living conditions of homeless people, their physical and mental health status, health care utilization, and barriers to health care. Where possible, the report compares the health of homeless people with the general population of Toronto, describes the social policy context behind a specific finding or set of findings, and makes connections to other research or good practices in the field that support or give context to our data. Based on the study findings, the report includes an action plan consisting of recommendations for key policies and services affecting homeless people and those at risk of homelessness. A separate summary document (*The Street Health Report 2007: Highlights and Action Plan*) was also created which focuses on report highlights and recommendations. For the final report and related documents, we worked with graphic

designers to create documents that were easy to read, professional looking, and engaging.

Using the qualitative interviews and photographs conducted with the subsample of survey participants, the National Film Board of Canada's Filmmaker-in-Residence Project created a series of compelling dissemination tools to complement our report. This included a large free-standing installation of eight portraits combined with the audio-recorded interviews of each person's experience of health and homelessness, a 9-minute film called *Street Health Stories* that weaves together the personal stories of survey participants with statistics from the report, and a series of photographs with embedded quotations that were used throughout our report. In addition, a series of shorter films of individual study participants in this component were included in an anthology DVD called *HandHeld* that contains other National Film Board of Canada material related to health and homelessness. Having this audio-visual component made our report more engaging and gave us additional and powerful ways of reaching a broad range of stakeholders.

Prior to and since the release of the report, Street Health has devoted substantial time to broadly disseminating and advocating on the report findings and key messages to a wide range of community, academic, policy, and political stakeholders. The report release was a press conference and public event that drew a diverse crowd of over 300 community members, media outlets, non-profit and government representatives, and politicians including the provincial health minister, a federal member of parliament, and representatives from the mayor's office. Over 1,000 copies of the report have been distributed for no charge to academics, politicians, and policy-makers at all levels of government and community partners; the report and summary are available on Street Health's web site (www.streethealth.ca). Media advocacy for the purpose of reaching the general public was another significant knowledge translation focus of the project. In the year and a half since the report became available, the findings and recommendations of the study have received over 40 media hits by a range of outlets including front-page coverage in local and national newspapers, follow-up articles and editorials, and extensive national radio coverage. The *Street Health Stories* film aired on national television the same week that the report was released. Shortly before and following the public release of the report, members of the research team met with several key politicians and senior policy-makers working in health and homelessness at the provincial, municipal, and regional levels, as well as senior hospital managers, to discuss the study findings and implications for relevant policy and program areas. In just over a year, approximately 20 meetings and presentations with government representatives including the municipal public health department and board of health, the board and managers from the regional health authority, the city's police services board, hospital and service managers, and a United Nations representative were made. In this same time period, over 60 presentations and deputations were made to community groups and organizations, faith groups, hospitals, municipal departments and committees, university classes and at academic conferences. These media interviews, meetings, and presentations were conducted primarily by the study coordinators but also often involved advisory committee members and peer researchers.

As part of Street Health's commitment to using research to inform social change, we strategically built on the momentum generated by the publication and dissemination of *The Street Health Report 2007* by securing funding for additional research, dissemination, and advocacy activities. Following the report release, we created a series of shorter focused reports on specific issues related to homelessness or subgroups within the homeless population using the original survey data. Bulletin topics included hepatitis C, women, crack cocaine use, concurrent mental health and substance use disorders, as well as a report synthesizing key findings and solutions from eight community-based and arts-informed research projects on homelessness (available at www.streethealth.ca). These bulletins involved additional analysis of the survey data and related policy implications and were released at strategic times throughout the year, often in support of and in collaboration with other community initiatives addressing these issues. These short research bulletins were disseminated through media work, public education, and interactions with politicians and policy-makers. For example, in partnership with Sistering, another multi-service community-based agency in Toronto for homeless and low-income women, Street Health developed a research bulletin focused on the unique experiences of homeless women in the study (Street Health, 2008). Over a period of 10 weeks, 6 months after the initial report was launched, staff from Street Health and Sistering worked together to identify key findings, develop recommendations, create the bulletin, and do media and advocacy work. These efforts were timed to influence the provincial government's poverty reduction strategy that was being developed at the same time and involved the organization of a large public forum where poor and homeless women were able to speak directly to the government minister in charge of the poverty reduction strategy about their experiences of homelessness and poverty (see Monsebraaten, 2008).

It is difficult to measure the direct impact of Street Health's knowledge translation activities in terms of achieving social change; however, some concrete actions have taken place as a direct result of the study findings and our related advocacy efforts. For example, the municipal police service used the study findings on homeless people's experiences of police violence to inform the service's business plan. The regional health authority incorporated key study findings and recommendations into their health equity strategy and a conference for health managers and service providers on health equity, making the report a key theme of the conference and using it as a framework for discussing how access to health care can be improved throughout the region. The municipal department responsible for administering welfare benefits has used the *Street Health Stories* film to train approximately 350 welfare workers, and the film has also been used to train service providers in hospitals and community health centers. An additional small but very important change has been the elimination of the practice by the Provincial Health of requiring a 3-month wait for health insurance for homeless people who are unable to prove residency in the province. Beyond informing and supporting Street Health's own advocacy work, the study findings have been used extensively by other community groups and have contributed to broader strategies to address poverty. Academics, community activists, and health-care providers have cited the report findings in

their writing, presentations, and media work on poverty and homelessness issues (see TCF, 2008; Wellesley Institute, 2007; YWCA, 2008).

Conclusion

Collaborative approaches to research that involve multiple stakeholders in a meaningful way are time consuming and require substantial material resources. Research that is also aimed at achieving social change is especially difficult because completing the research and publishing the findings are just the beginning. Some of the most important work occurs after the research is completed through ongoing dissemination and advocacy. Achieving concrete social change is typically a slow process that requires persistent effort and may only result in incremental changes over time. Continuing to keep partners and stakeholders engaged and finding new ways to raise awareness and mobilize action around research findings is a major challenge. The challenges of community-based and TD research are heightened by the fact that in Canada, very little funding exists that promotes and supports community-led, highly collaborative research with a strong dissemination and advocacy focus.

Despite the challenges of conducting community-based and TD research, our approach to *The Street Health Report 2007* allowed us to accomplish what a traditional academic study could not. Using a TD, community-based approach improved the quality and validity of our research, giving it both academic and community credibility. Involving a broad range of stakeholders and community members helped to ensure that it was relevant to a diverse range of audiences and end users. The mixing of quantitative and qualitative methods, in combination with an evolving and dynamic research process, allowed for the creation of a powerful series of dissemination tools that greatly enhanced the study's knowledge translation impact. Involving the community of study helped build capacity and had immediate benefits for homeless community members while grounding the research in their experiences. The study's emphasis on dissemination and advocacy has already begun to have significant impacts on Toronto's homeless population, and we hope that our project will continue to contribute to substantial and meaningful social change that addresses homelessness and poverty in the long term.

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Chapter 6
Safety as a Social Value: Revisiting a Participatory Case Study in Scotland

Helen Roberts, Susan J. Smith, Betty Campbell, and Cathy Rice

This chapter revisits research carried out in the early 1990s in Scotland on child accidents – a key public health problem in rich and poor nations alike, and one where there are stark differences between better off and worse off children. The research (Roberts, Smith, & Bryce, 1995) was forged through a close collaboration with the residents of Corkerhill, a former railway village in Glasgow, Scotland. Four community members were pivotal to this work, two of whom have co-authored this chapter. The study was designed and carried out by Helen Roberts and Susan Smith, assisted at different stages by Michelle Lloyd, Carol Bryce, and a team of interviewers.

This research adopted a case study approach rooted in the experiences of one community using a design that turned the more common approach to child safety on its head. Rather than asking 'What is it you do that puts your children at risk?' we aimed instead to elucidate, through qualitative and quantitative work, an answer to this question: 'How do you manage to keep your children safe for so much of the time?' The work comprised a quantitative census, on the one hand, together with elements of participatory research with adults and children, on the other, all in order to focus on the determinants of health, in particular housing, poverty, and inequalities in child health.

The researchers, a medical sociologist and a geographer, came to the work with different skills and expertise but were united by an interest in health inequalities – in Smith's case in relation to housing and in Roberts' case in relation to a population group – children and young people. These links were significantly enhanced by the lay expertise of people living in Corkerhill whose involvement made this not just a transdisciplinary (TD) piece of work but one which crossed professional and lay boundaries in a way that was rather novel at the time.

Almost two decades have passed since the work was first planned in the early 1990s. Times and places have changed, but the underlying issues have not. Indeed, the recent World Health Organization (WHO) Commission on the Social Determinants of Health (CSDH) makes it clear that unsafe environments and non-intentional injury are even more of a problem at the global level than in the UK

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(CSDH, 2008; Marmot, 2007). Injuries account for just under 10% of global mortality, constituting a major and growing global public health problem (Roberts & Meddings, 2010). While there is now greater acceptance that the determinants of injury need to be addressed, there remains for many in the field an attachment to trying to address injury primarily through changing individual behaviour. Any reduction in child mortality from accidental injury over the last 20 years in wealthier nations is likely to be associated with reduced exposure to risk (as children spend less time doing 'risky' things, including things which might otherwise be fun, educational or even health-promoting) and improved medical intervention. A real reduction in the likelihood of injury in a given social and environmental setting remains elusive. This lack of attention to underlying causes is particularly disappointing for us, since a clear finding of the research in Corkerhill was that child accident risks were high as a result of the design, management, and servicing of the area and that most children remained safe most of the time because parents prized safety as a social value.

In exploring the cross-boundary and TD nature of this research in this chapter, we describe our work in Corkerhill as a series of collaborations:

- Working with the community
- Working with professionals, and
- Working with each other across disciplinary boundaries, and in the case of members of the community, more profound divides

Working with the Community

Corkerhill is bordered on one side by a busy main road, on another by a railway line, on a third by a river, and at the back by an area of parkland, which, since the time of the research, has been transected by a new motorway. At the time of the work described here, Roberts – who was planning a community study on accidental injury with the Social Paediatric and Obstetric Research Unit at the University of Glasgow where she worked – took a telephone call from a mother in Corkerhill, who described to her a concern among her peers about the effect of damp housing on their children's health and, in particular, respiratory problems. Chemicals were being used to 'treat' the damp. 'What', the mother reasonably asked, 'can you tell us about this?' This was not a question that we were qualified to answer, though we were able to point them in the direction of Edinburgh colleagues doing groundbreaking work in this area (Martin, Platt, & Hunt, 1987; Platt, Martin, Hunt, & Lewis, 1989). This was the first step in our collaboration. While we were not able to do what was asked, we could provide links, and we had shared interests with these parents in the determinants of health.

A meeting with a small group in the community followed, and here it became apparent that parents were concerned about their children's safety but felt undermined by a victim-blaming model of accident prevention underlying contemporary educational campaigns whose advice seemed unrealistic. As David Stone (1989) has

provocatively pointed out, this style of health education is cheap, generally uncontroversial, and safe: If it works, the politicians take the credit, and if it does not, the target population takes the blame. Even to our – at the time – untrained eyes, some of the safety messages to parents were clearly absurd. For example, leaflets and posters warned parents that accidents happen to children who are:

- overprotected – they will be nervous and unsure therefore unsafe – or they may rebel
- under protected – they will be unaware of the dangers
- not supervised
- angry
- tired
- showing off

It is hardly surprising then that a frequent observation of the parents we spoke to was captured by one mother who explained that:

> It seems as if there is no happy medium. You either let them out and you're careless, or you keep them in and you're over-protective, and your lad's gonnae have an accident because you cannae teach it to be street-wise if you've got him in the house. (Roberts et al., 1995, p. 66)

When parents got together to try to make a difference, it took the form of a bid to the local health promotion team for a pool of shared safety equipment. They were told that they could have the money, not for a safety equipment co-operative but to develop posters to promote safety.

What followed was a number of funding applications made by the researchers, and informed by community activists, to address accidental injury in children. A small grant from the Nuffield Foundation was secured for pilot work, followed by a larger grant from the Chief Scientist's Office of the (then) Scottish Home and Health Department to fund a study looking at the antecedents, character, distribution, and consequences of child accidents in a disadvantaged urban area.

While there is an increasing emphasis on addressing clinical and other research questions that come from a 'user,' patient, citizen, or lay perspective, it was, and still is today, rare for academic researchers to be approached out of the blue with a request for research. It is this shift in the involvement of lay people in research which is so salient for this chapter, embracing as it does, a key ideal of the recent participatory turn in social research in which 'lay' collaborators play a part in defining the research from the outset (Pain, 2004). It is perhaps because of an early phase of familiarization with Corkerhill and its residents that we were interested in looking at what people were doing *right* and in discovering how to build on this, rather than adopting the more usual approach and asking what they were doing wrong before telling them how to put it right.

We had already seen what people were doing to keep their children safe; already witnessed the potential for disaster in the fast roads, awkward designs, and risky 'hard-wiring' of the housing environments. So as well as focussing on accidents

that *really* happened, we were also interested in learning about accidents that *nearly* happened and in discovering how, why, and by whom, they were averted. There is a substantial literature on how risks in anaesthetics, aviation, and other 'risky' areas have been better understood and managed by looking at near accidents – the ones that don't quite happen – as well as those that do (Barach & Small, 2000; Expert Group on Learning from Adverse Events, 2000; Reynard, Billings, Cheney, & Hardy, 1986). We felt that there was a good deal to be learned in a similar vein from those living in environments that had not been built primarily with safekeeping in mind.

As a result, our study was designed to identify factors predisposing children to be at risk of, and protected from, accidents in the home and the wider environment. We aimed to investigate and learn from the strategies that children and families routinely adopt to maintain safety. We employed three methods for our fieldwork, all of which demanded a high level of buy-in from the community.

First of all, and in order to inform our research questions, we used a series of group interviews with parents and with teenagers, each of which met weekly, on three occasions, to build rapport. We also held a single group interview with local professionals dealing with safety to discuss the nature, causes, and consequences of accidents. The second step, a survey, was in effect a local census. Of course, we had access to official statistics on injury mortality and morbidity, but we wanted to know about the antecedents, incidence, and effects of accidents which too often go unrecorded. Furthermore, given that the same set of circumstances – crossing a road, a house fire, putting an exploratory fork into an electric socket – may result in no injury, serious injury, or death, we were as interested in the accidents which didn't happen, and the near misses, as those that do.

The survey was delivered by trained interviewers to every household in Corkerhill (with a longer questionnaire to households with children). It provided population-based data on the accident event rather than injury prevalence in the community by asking about experiences of accidents: their seriousness, location, age of children, immediate cause, and so on over a given reference period. From this, we derived a sample for the third element of the research – a series of in-depth case studies of accidents and near accidents that children had experienced and parents dealt with in the preceding year. These were designed to examine the scope parents and others in the community had in anticipating or intervening in these incidents.

We were not the first people to conduct a mixed-methods study using qualitative work to inform a quantitative survey that in turn informed case studies. But mixed-methods research only secured its own journal in 2007, and at the time the combination of this approach with the close involvement of people in the community, contributing to the transdisciplinarity of the study, was unusual. Even more unusual was the fact that the community chose us rather than the reverse, and this may well have been pivotal in the exceptional response rates. Fully 95% of households responded to the survey indicating that, from the outset, this community was engaged. Community members advertised the study widely, and while we may have had some misgivings about the way in which it was presented primarily as a housing study, with an implication that it might result in change, the work was indeed

about homes and housing types as well as health. On coming back to the study to write this chapter, all four authors agreed that the common ground was the health of local children, and while an appealing 'way in' were the 'housing and health' and 'safe play' perspectives, it was never difficult to see poor housing and the local environment as determinants of injury.

While the researchers gained a huge amount from the community and from the study, we were also seen as a resource and were called upon to offer some reciprocity. One of the community leaders, the late Walter Morrison[1] and others ran a 'Damp House Enquiry,' with evidence from local people, and attendance by local councillors. While not acting in a formal capacity, our presence enabled us to bear witness to the ways in which the consequences of poor environments were being resisted. When we met a family whose child had cystic fibrosis living in an apartment with damp running down the walls, one of us who occasionally wrote health features for a Scottish newspaper was able to cover it. The family was re-housed and the news piece may have played a part.

From our point of view then, working with the residents of Corkerhill was at once an effective research strategy (boosting buy-in and participation across the community) and played a (very limited) service role in the ways described above. It was also quite uncomplicated; we did not feel conflicted, angst-ridden, or particularly anxious ethically about what we were doing. Perhaps we should have. But at the time it seemed like a straightforward, mutually rewarding, and practical project. And through our continuing links, the relationship has lasted. The editors of this volume asked us to consider why these relationships were relatively easy. We have no great insights into this except that, like all good relationships, it took time and accommodation on both sides. As much of the university sector toys with Taylorism, with standard task-based methods and timescales, it may be that these kinds of engagements with civil society will become more difficult. Cathy Rice wrote at the time:

> We in Corkerhill ... recognize that the professional research body may be able to take information through doors which the community cannot open, but we have learned to be cautious ... of those who would 'assist' us in this way. Too often, we have been subjected to the 'goldfish bowl' approach to research. ..The researcher selects the topic, studies his subject, and returns to the lofty towers of academia leaving a bemused community who very soon realize they have gained nothing from the experience. Despite this apparent cynicism, not only do we recognize the need for good research and the powerful potential it may have, but we are confident enough to believe that we may have a contribution to make to it (Rice et al., 1994 p. 117).

Working with Professionals

We describe here three aspects of cross-boundary and cross-disciplinary work with professionals or people with other skills. One relates to our interviews in the community (and so relates to a craft skill); one to the professionals (largely health

[1] http://libcom.org/history/morrison-walter-1924-2004 http://www.safecommunity.net/SCWN/2004/SCWN14April2004.pdf

promotion, police, and housing) with whom we interacted as part of the research or with whom we became involved as a result of the research; and one to the WHO Safe Communities Network.

We had initially planned to employ local people as interviewers, not least as a way of putting employment into the community. This was roundly turned down by members of the community, partly on the grounds that professional, trained interviewers were called for if the work was to be taken seriously. There were other considerations too since paid work would have had implications for families on benefit, in some cases, leaving them worse off. We thus turned to professional interviewers, most of whom were generally employed by the Medical Research Council Medical Sociology Unit in Glasgow. Their professionalism and sheer doggedness, alongside the commitment of community members, gave us outstanding response rates.

In relation to a different group of professionals – those whose 'patch' or responsibility included Corkerhill and its residents – we completed a single-group interview at the scoping stage of the work. Those involved were a health visitor, two health promotion officers, a police sergeant, a representative of the housing department, a fire prevention officer, and a road safety officer. While some of our reflections at the time were somewhat critical of the educational approach they advocated (Roberts, Smith, & Bryce, 1993), we also recognized that they, like parents in the community (and indeed like us), were subject to constraints in what they could do. Furthermore, at the time, work on the social determinants of health was less prominent than it is now. So we should hardly have been so surprised that there was a disjuncture between the views of the community on the aetiology of accidental injury and that of the professionals – or of the differences in perspective on what needed to be done.

One other single event in terms of relationships with health professionals is salient here. Parents had raised with a health professional the problem of having to wait for a day for prophylactic treatment at the local hospital after injuries to their children from used needles left in the common entrances to their buildings. This was because the treatment had to be obtained on a named-patient basis from the blood transfusion centre some distance away. All of this coincided with a media campaign in the United Kingdom, using the metaphor of icebergs in a less-than-successful but nonetheless terrifying attempt to change behaviours in relation to HIV/AIDS. The health professional was not wholly sympathetic, pointing out that parental cigarette smoking probably held more dangers for their children than did the needle in the entry to the buildings. A letter from the community to the most senior public health doctor followed, as a result of which the day's waiting policy for prophylactic treatment was changed. Irrespective of whether this was the right policy, or altered anyone's risk, it was a powerful indicator that individuals in the community could bring about change, using one of the mechanisms more commonly utilized by the more privileged: lobbying and networking. We repeat it here, since, even almost two decades on, one of the community authors of this paper, Cathy Rice, points out that it continues to resonate.

The final aspect of working with professionals relevant here was our work with the community on their application to become a member of the WHO

Safe Communities Network (Corkerhill, 1992). Established by Leif Svanstrom at the Karolinska Institute in Sweden, this is a worldwide network of communities working to become safer. The application was successful; site visits were made to Corkerhill (WHO Safecomm, 1992) during the second International Safe Communities Conference, and Corkerhill and its residents were featured in an Open University program as an example of the ways in which lay knowledge can be used to bring about change.

After the Study

In Corkerhill itself, much has changed in the 16 years since the study was completed, including an almost complete rebuild of the housing. The new housing brought benefits for some tenants, but many of those who lived in Corkerhill when we carried out our work were decanted out to other places and never returned. In that sense, they did get what they asked for – new housing – but not for the population in residence at the time. Betty Campbell describes this:

> The likes of myself. You see it first hand. The houses aren't built with people in mind – not the people who were living here in the tenements. They got moved out. They're here, there and everywhere now. [The houses] weren't supposed to be buy-to-let. . . . They were meant to be affordable. . . .

There is now mixed tenure in the housing scheme and although by UK standards, £150,000 or less for two- and three-bedroom houses with the much-coveted gardens that every parent on the estate yearned for is well under the national average price, it is well beyond the reach of many. We were told that 'buy-to-rent' ownership meant less community engagement and solidarity. The row of buildings where the old community 'shop' – which was actually a meeting place – used to be, housed a social inclusion partnership building at the time of one of the researcher's last visits. Betty Campbell tells us that it now houses a mental health charity. There is better landscaping to the play area – though with the usual broken glass and discarded needles, as well as graffiti. 'Paka boyz fuk the polis' on the footpath over the new motorway indicates a less than warm relationship between some of the lads and the local constabulary. Betty suggests: 'The police have lost communication with the kids.'

A recent review of UK area-based regeneration initiatives (Thomson, Atkinson, Petticrew, & Kearns, 2006) has shown some improvements in average employment rates, educational achievements, household income, and housing quality, all of which may contribute to a reduction in inequalities in health, but it also noted that there can be an increase in housing costs which renders residents poorer and that the original residents in the regenerated areas may have left the area. As Cathy Rice points out, 'Corkerhill is not the only example of rebuild and mixed tenure housing that effectively disperses the population and "improves" the economic status of an area.' As she puts it: 'new ghettos have been created'.

Of the four people from Corkerhill most closely associated with the research, two remain in Corkerhill: Betty Campbell, one co-author, remains in the house she

occupied at the time of the study, though the motorway now skirts her boundary: 'You don't get used to the noise. . ..' Walter Morrison died, fighting injustice to the end. Betty says:

> You need people who can speak out. The way we were before, we had something. We knew everybody. The ones with short term housing now – the ones who rent short term, they're not staying. There's nobody to speak out any more. If Walter was here, this wouldn't have happened. . . . If they'd done the houses up, things might have been much better. . .. My kitchen cupboards are up by the ceiling, you'd need to be King Kong to reach them.

Cathy Rice is now a senior manager in a Health and Care Partnership in Glasgow and no longer lives in the area. She went on to work with geographical communities and communities of interest from a participatory perspective and describes the Corkerhill work as having encouraged her to consider how the impact and outcomes from research and interventions can be measured.

The work influenced the futures of the researchers. Roberts went on to do more work on inequalities in health and spent the next decade running Research and Development in a children's non-governmental organization. She was one of the investigators in a Medical Research Council-funded, randomized, controlled trial of smoke alarms in inner London. House fires have one of the steepest mortality gradients of all, with a poor child 15 times more likely to die in a house fire than their better off neighbours (Roberts et al., 2004; Rowland et al., 2002). Smith went on to complete various other collaborative, qualitative research programs, drawing from lay knowledge and experiences informed by the Corkerhill work. Among other things, this work enabled her, with colleagues, to argue that the link between housing and health is about health discrimination as well as environmental risks (Smith & Easterlow, 2005); that lay publics have the capacity to assimilate complex information, engage in subtle argument, and arrive at well-reasoned, clearly warranted conclusions about issues as complex as genetics and insurance (Bennett & Smith, 2007); and that housing wealth has become a precarious financial buffer for rich and poor households, exposing a broad cross section of the public to a range of welfare as well as financial risks (Smith, Searle, & Cook, 2007, 2009).

Working with Each Other: Lay Expertise, Community Engagement, and Transdisciplinarity

Public health measures are interventions just as hip replacements and immunizations are. In both cases, the people on the receiving end have knowledge that academics and health professionals do not. At the time of the Corkerhill study, this lay knowledge was a relatively untapped resource. The role of research with lay people tended to consist of obtaining data in order to enhance a presumed knowledge deficit rather than to harness and share a store of lay expertise that had been developed through experience and was grounded in local knowledge. The medical sociologist, the geographer, and the community were (more or less) agreed on at least one of the endpoints – contributing to our understanding of the determinants of child injury – and were also agreed that this involved mining rather than manufacturing

local knowledge and experience. But we had differing approaches to the means of achieving this, some of which are described above. Within the community, there was a range of styles of engaging with the housing department, local councillors, and so on. Our job as academics was to conduct the best quality research we could and put the work into the hands of the community as well as peer-reviewed journals and other academic outputs.

Our work to this end would probably now be termed interdisciplinary or TD, a goal to which scholars are increasingly encouraged to aspire but which institutional structures and funding systems can make difficult. The Corkerhill experience leaves us with something to say about this. We found that it was not very difficult for researchers in different fields to collaborate on a topic that interested them. This may be because neither of the researchers was in a disciplinary centre at the time: Roberts was in a social, paediatric, and obstetric research unit, and Smith was a geographer working in a social and economic housing research centre. It did not matter much to us or to our careers where we placed the outputs or how we positioned the work in a disciplinary sense. It may be less easy for researchers at the start of their careers to follow this model today. Even for those who are more senior, peer reviewers' expectations (ourselves included) may be influenced by those 'invisible colleges' in which those of us trained in a single discipline become part. But it cannot be said that we felt any real tension as a product of our different disciplinary histories or expectations; neither of us can remember struggling with concepts, theories, interpretations, and so on.

There is now helpful guidance literature on community engagement (e.g. NICE, 2008) as well as some literature on whether participation in itself results in better outcomes – largely in terms of health (Crawford, Rutter, Manley, Weaver, & Bhui, 2002) and also in terms of regeneration (Burns, Heywood, Wilde, & Wilson, 2004) and social care.[2] This literature is equivocal, since much participation is not well evaluated – and where it is, there tends to be a focus on process rather than outcomes. In our view and given the current state of knowledge and the fact that time is one of the assets of those living with disadvantage and should not be squandered by researchers, lay participation in research should:

(a) itself be evaluated (not something which we did ourselves and something that needs careful design to reduce bias);
(b) be synthesized so that findings can be used more than once where appropriate, thus respecting the time of participants (while much data are contextual, good reporting on context will enable a judgement to be made on the extent to which data are transferable); and
(c) encourage the generation of new questions – a process which is happening to some extent, for instance, with the James Lind Alliance identifying the most important gaps in knowledge.[3]

[2] http://www.scie.org.uk/publications/resourceguides/rg07/index.asp
[3] http://www.lindalliance.org/

In addition to these, Rice suggests that a work plan, timescale, and anticipated outcomes to follow the research should be agreed upon at a local level so that tangible outcomes can be evidenced. Some aspects of our work, which might now be called knowledge exchange or knowledge transfer, represented new steps for us in terms of dissemination. It was about trying to reach different kinds of policy, practice, and lay audiences (Smith & Roberts, 1991, 1995). A video was made on housing and health (Stone & Roberts, 1991). People from the community spoke at local, national, and international meetings and, where possible, the academic researchers and people from the community spoke together. We talked about the work at sociology and geography conferences, and at scientific meetings in public health and at meetings of safe community networks in different parts of the United Kingdom. There was little or no funding at the time for this kind of event but there was an enthusiasm from those trying to improve safety in their communities to hear from those who were working to do so. What perhaps legitimizes our time spent on this project in terms of the academy has been the body of work acknowledging and building on lay knowledge as a way of knowing which is important in building the evidence base (Gough, 2007; Oliver et al., 2004; Popay & Williams, 1994; Rice, Roberts, Smith, & Bryce, 1994). What remains a research question is the issue of whether lay 'involvement' is a fad or a fashion, a political statement, or whether there is any evidence of benefit to those who provide their lay expertise.

Did we have an explicit TD, multi-disciplinary, or interdisciplinary perspective at the time we conducted the work? Probably not, though the geographer and the medical sociologist each learned from one another's perspectives and both learned from those living, in some cases in some hardship, in Corkerhill. Did we self-consciously use different ways of looking at problems, different methods, and different approaches to data to craft a piece of work that we would not otherwise have done? To an extent we did, although this was about using a sufficiently wide range of methods to meet funders' and peer reviewers' legitimate expectations without compromising the close community/researcher links. A more intriguing facet of the project's methodology has been the way the work crossed other kinds of knowledge boundaries, particularly those which unite or divide lay publics, research communities, and the policy process. Some of our methods, including some of the participatory work, particularly with children and young people which were probably somewhat ahead of the time, have been further developed by others (and by us) (Curtis, Liabo, Roberts, & Barker, 2004; Curtis, Roberts, Copperman, Downie, & Liabo 2004; McNeish & Turner, 2001). The group work we did as a first stage in our fieldwork used a method that plays a much larger part now than it did at the time in harnessing lay expertise. What has changed is an increasingly open approach to synthesis, to working across disciplines, and to the participatory methods we used.

Perhaps the final word should be left with Cathy Rice, a community participant who became a health professional:

> I am sorry to say that although the principles are much heralded, the reality now is that participation is strangled by the structures that claim to have adopted the approach but have had the effect of neutralising community voices rather than engaging them. The 'speak' of engagement and empowerment is evident but strangled by bureaucracy.

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Part III
The Process of Transdisciplinary Research

Chapter 7
Methodological Notes on Conducting Transdisciplinary Research

Patricia G. Erickson and Jennifer E. Butters

What sorts of populations are most appropriate for the application of transdisciplinary (TD) methods? Quite easily accessible groups such as householders, patients, or students, who may be found in a particular location or institution, can be reached by a number of traditional methods like random digit dialing, clinical trials, or in-class surveys. But when the researcher takes to the community, infiltrating the urban landscape to contact marginalized, less accessible, and more vulnerable populations, a reconsideration of methods is called for (Rosenfield, 1992). When the activity of interest is also illegal, such as illicit drug use or other crime, an even greater challenge is involved. This chapter argues that, while obstacles are apparent, the adoption of a TD approach offers strategic advantages for research on inner-city health issues, particularly those affecting at-risk youth.

The urban health problem that provides the focus of this chapter is substance misuse and dependence among at-risk youth. The use of illicit substances cannot be viewed in isolation but is rather the complex product of background and social environmental factors. Young people who become heavily involved in substance use may in turn become the dropouts, the delinquents, and the homeless youth who become visible in inner-city neighborhoods (Adlaf, Zdanowicz, & Smart, 1996; Baron, 1999; Haley & Roy, 1999; Johnson, Whitbeck, & Hoyt, 2005). These youth in turn may incur significant health and social service costs and, if their trajectories remain unchecked, have a high likelihood of becoming homeless as adults (Daly, 1996; Erickson, Butters, Hallgren, & McGillicuddy, 2000; Hagan & McCarthy, 1998; Strike, Myers, Calzavara, & Haubrich, 2001). Such lives may be marked by high rates of drug dependence, criminal involvement, victimization, and poor health profiles and outcomes (Adlaf & Zdanowicz, 1999; Gaetz, 2004; Kipke, Montgomery, Simon, & Iverson, 1997; Roy et al., 2004; Whitbeck, Hoyt, Yoder, Cauce, & Paradise, 2001). Society therefore has a considerable stake in finding out as much as possible about at-risk youth at an early stage and designing effective and appropriate interventions that actively engage this population (Benoit, Jansson,

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Hallgrimsdottir, & Roth, 2008; Paterson & Panessa, 2008). Part of this effort may usefully be directed at their risky substance use behaviors.

Over the past 10 years, our involvement as investigators in two major studies of youthful drug use provided us with valuable experience in creating designs that will provide the best possible data. In these endeavors, we have worked in collaborative teams, connected with stakeholders, and employed multiple methods adapted to shifting circumstances in the field. The first study, Drugs, Alcohol and Violence International (DAVI), provides an illustration of unidisciplinary research. The study examined this topic through the lens of one predominant discipline, that of quantitative criminology. The second study, the Youth Pathways Project (YPP), brought diverse perspectives to bear from a much broader range of fields including child welfare, psychology, medicine, qualitative sociology, public health, and criminology. Various subspecialties were further reflected by team members' expertise in child abuse, sexual orientation, service delivery, violence, suicide, and mental health. We will briefly describe each of these studies, then present the practical and methodological lessons learned, and indicate where the TD approach was more productive.

The Studies

DAVI: Drugs, Alcohol and Violence, International

The DAVI study was multi-national but not TD. The primary source of funding for this project was provided by the National Institute on Drug Abuse (NIDA), a US funding organization within the National Institutes of Health. The funds were therefore held by the University of Delaware partner and subcontracted to the Centre for Addiction and Mental Health (CAMH) in Toronto, Canada to enable comparative study and highlight possible explanatory social, environmental, and policy factors in the two countries. A team of criminologists, all of sociological orientation, designed a quantitative study to assess the relationship between drugs and violence among adolescents aged 14–17 years in Toronto and Philadelphia. The DAVI study was guided by the work of Goldstein (1985; Goldstein, Brownstein, Ryan, & Bellucci, 1989) on the drugs–violence tripartite nexus that he and his colleagues had observed in studies of homicide and other violent crimes in adult criminal populations, in relation to specific drugs like alcohol and crack cocaine. With the aim of advancing this line of research, hypotheses were generated to examine the psychopharmacological, economic-compulsive, and systemic relationship between drugs and violence among youth. This study allowed for the examination of these relationships for multiple types of substances among adolescents in different cities and countries. To examine these issues, three groups of youth in each city – students, dropouts, and incarcerated delinquents – were surveyed (in classrooms) or interviewed (in the community or institution) using the same questionnaire.

After the grant was awarded in 1999 and the design established, two additional teams also made up of criminologists received further independent funding and joined the study from the University of Montreal and the University of Amsterdam.

Thus, data were collected from four sites in three countries. While Toronto and Montreal are both large Canadian cities, different languages predominate in the provinces of Ontario (English) and Quebec (French), historical cultural differences exist around issues such as religion, and different policies are in place regulating the availability of alcohol. Therefore, this study can be seen to reflect youth from four varying cultural backgrounds. All data were collected from 2000 to 2003, and several co-authored publications have resulted or are in preparation (Adlaf, Korf, Harrison, & Erickson, 2006; Benschop, Harrison, Korf, & Erickson, 2006; Brochu, Cousineau, Sun, Couvrette, Erickson, & Harrison, 2007; Butters, Harrison, Adlaf, & Erickson, 2009; Erickson, Butters, Cousineau, Harrison, & Korf, 2006; Erickson, Butters, Korf, Harrison, & Cousineau, 2006; Korf, Brochu, Benschop, Harrison, & Erickson, 2008).

YPP: Youth Pathways Project

The second major study, the YPP study, was not formulated initially in explicit TD terms but rather evolved that way in the course of the team planning and implementation meetings. The two prime academic movers of the initial proposal came from sociology/criminology and psychology/child welfare. In fact, our interest was first sparked when a frontline medical professional who worked in an agency serving street-involved youth made contact with us at CAMH, a leading Canadian research-oriented mental health and addiction health-care center in Toronto. The impetus for this meeting stemmed from concern frontline workers were experiencing regarding co-morbidity in this population and the lack of research. Multiple sources of funding for this study were obtained. Preliminary funding to launch the interviews with street-involved girls was secured from the Social Sciences and Humanities Research Council of Canada (SSHRC), a federal funding agency designed to support university-based research and facilitate collaboration across research disciplines, universities, and all sectors of society. The study was extended to street-involved boys through funding provided by the Canadian Institutes of Health Research (CIHR). This agency has a mandate to support the creation of new knowledge and its translation into improved health for Canadians and strengthening the Canadian health-care system. As noted earlier, from the onset, a team of academics, graduate students, and agency staff from diverse backgrounds was assembled to plan and execute the study design. In 2004–2005, 75 male and 75 female youth were interviewed via contacts with agencies serving street youth in the downtown core of Toronto. In a further development, a call (from SSHRC) for dissemination proposals drawing on prior research on homelessness led to the funding of a web-based story telling project involving street youth (www.tyss.org) (Erickson, King, Ross, & Wekerle, 2009). Team members have submitted and are preparing several papers for academic publication, and other reports have appeared on the web site or in staff/practitioner-oriented outlets (King, Ross, Fidler, & Erickson, 2009; Kirst, Erickson, & Strike, 2009; Ottaway, King, & Erickson, 2009).

Features of TD Research: DAVI vs. YPP

In considering the generation of knowledge by TD research, we are guided by three distinguishing features (Wickson, Carew, & Russell, 2006), namely problem focus, evolving methodology, and collaboration. We shall consider the benefits of the TD approach epitomized by the Youth Pathways Project study in contrast to the unidisciplinary Drugs, Alcohol and Violence International project. These contrasts will not always be clear-cut but will suggest a kind of evolution in our personal research careers as we became more attuned to more inclusive and socially accountable processes, in the service of more beneficial societal outcomes.

Formation of the Research Problem

The first methodological aspect to be considered is the formulation of the research problem itself. This is crucial both at the commencement of the study and at its completion when policy implications are being considered. In contrast to standard research themes that are theory or "curiosity" driven within a particular disciplinary framework, TD starts with a sense of a complex, real-world problem that requires action to create change. A practical outcome or solution is sought.

DAVI: In the DAVI study, the team members started with a conceptual issue, the relationship between drugs and violence, and the desire to provide empirical evidence of how it was expressed in different types of adolescent populations, both conventional and at-risk. Formulations were drawn from the academic literature and the primary goal was to contribute to that literature, although the team hoped to provide practical recommendations down the road. However, initial input from policy stakeholders was restricted to gaining permission to access youth in schools, community agencies, and correctional institutions, not to formulate the research questions.

YPP: For the YPP study, the springboard was a request for proposals (RFP) from the federal agency responsible for homelessness in Canada, the National Homelessness Initiative, in partnership with a social scientific funding organization, SSHRC. Hence the initial formulation of the problem was as a strategic grant, geared to providing research results that would have practical applications to the homelessness problem. It was clear that the proposal would be judged in applied as well as scientific terms. As such, the core research team included research representatives from agencies working with homeless youth, academics who had already done "hands-on" research with such youth and were connected with service providers, plus others whose expertise lay in the youth area more generally. All team members had some track record of research on at-risk youth, whether from the perspective of sexual orientation, maltreatment history, mental health problems, or substance use. The entire team was concerned with having "consequential" results that would be directly relevant to policy makers. The two specific partner agencies in the child welfare sector, the Children's Aid Societies (CAS) and a community health center for street youth (the Shout Clinic), were well aware of the problems facing homeless youth and thus could identify areas where knowledge was urgently needed.

One gap in the research that was identified both from the literature and first-hand experience with street-involved youth was the lack of studies specifically on female youth (Chen, Tyler, Whitbeck, & Hoyt, 2004). Girls usually have been excluded or under-represented in research that tended to emphasize *male* street youth and their problems (who do tend to be the majority of this population by about 2:1). Thus, when it appeared initially that the resources available for the YPP study (from SSHRC) would allow only a limited number of interviews, it was decided to focus first on female street youth. When a second grant was received (from CIHR), we extended the study to include an equal number of male youth (75 of each sex). We were thus able to argue for the importance of doing a gender-based analysis of adolescent, homeless youth in Toronto in order to determine if different factors influenced their trajectories on and off the street (Gaetz, 2004). We also formulated the problem in terms of the importance of doing a longitudinal study, also rare in research on this population, in order to have a better sense of how their problems with housing might fluctuate in relation to substance use, mental health, and other factors (Baron, 1999; Ennett, Bailey, & Federman, 1999; O'Grady & Gaetz, 2004).

In all, the problem focus of the YPP study and the awareness of its multidimensional nature led to the formulation of specific questions about perceptions of discrimination, service access and utilization, and youths' treatment by the police and other service professionals. Many studies of street youth have emphasized only one particular element like physical health or mental health or drug use or maltreatment or victimization or criminality (Baron, 2004; Johnson et al., 2005; Roy et al., 2004). The depth of backgrounds and experience in the research team meant the inclusion of a panoply of relevant topics, more than in any other study we reviewed about this population.

To some extent, we went further in the DAVI study than in many typical criminological studies that focus on drugs and crime by also including questions on mental health. This was due mainly to the reality that our Toronto team was based in an addiction and mental health facility and one team member had specialized in this area. In any collaborative endeavor, members of the research team will have particular research interests they wish to include on the questionnaire. In this particular project, one competing interest was between the inclusion of mental health and firearm items, the latter a particular interest of another team member. Several discussions were necessary to orient all team members to the value of including both types of measures in understanding drug use and criminal behavior. In the end, a compromise was reached whereby a reduced number of items tapping into both areas were included. This experience helped prepare us for the much more integrated approach of TD in the YPP plans, and we also believe led to a better outcome in the reach of the study.

The Nature of Methodologies

Determined in part by the context and scale of the study, the second aspect of TD to consider is the nature of the methodologies employed.

DAVI: For DAVI, we sought large samples (a target of 1,200 respondents in each city), we needed a questionnaire that could be both self-administered (to the students) and used in a one-to-one interview situation (with dropouts and delinquents), and we were planning to conduct a multivariate analysis of the data. Guided by sociological training, the research team developed a standard instrument drawing on existing studies in the criminological literature. Before the questionnaire was finalized, focus group testing was conducted both with high school students and with youth at drop-in centers. Although there were no open-ended or explicitly qualitative aspects, in the interview situation the respondent sometimes elaborated and notes were taken. By the time we were developing the questionnaire, the Dutch colleagues had joined the team and contributed to the methodology via our monthly conference calls. The French members joined later and the main issue was adequate translation so the study could be carried out in Montreal, though matters of standardization of procedures still had to be addressed.

Two examples illustrate both the responsive and the non-responsive nature of the DAVI team's approach to methods. In the first instance, a very fundamental dispute erupted over a national, rather than a disciplinary, difference. Usual criminological practice in the United States involves collection of data on participants' race, and the NIDA granting system explicitly requires it. Researchers in Canada have typically focused on both race and ethnicity and have used a broader range of response categories than the standard US categories for race. In the Netherlands, the very concept of "race" is rejected on cultural and historical grounds, and "ethnicity" presents quite a different set of possibilities than in North America. In the end, both race and ethnic background were recorded in Toronto and Philadelphia, while only ethnicity was recorded in Amsterdam. The discussions around the issue of race and ethnicity stimulated the development of a joint paper exploring the meaning and utility of various ways to measure these concepts in a multi-national study (Benschop et al., 2006).

In the other DAVI example, the final questionnaire contained items asking about the quantity and price for alcohol and marijuana and in what units they were bought. Once fieldwork began, the Toronto interviewers reported that the respondents thought the questions were "silly" and hard to answer. Alcohol is available in a very wide range of products and related pricing and marijuana in pre-determined categories, though amounts may fluctuate (e.g., $10 for a dime bag, $5 for a nickel bag). The Toronto team felt strongly that these questions interfered with rapport; the Philadelphia members wanted to keep the questions; in the end, Toronto stopped asking them, a source of strained feelings later when Toronto showed more missing data than other cities (Harrison, Erickson, Korf, Brochu, & Benschop, 2007). Both examples show that when disagreements arise over specific methodological content, it can be difficult to reach a compromise. No doubt such disagreements over questionnaire items are intrinsic to all studies with more than one investigator, but perhaps a greater appreciation for a qualitative, reactive methodology in the DAVI study would have helped to resolve the problem. The lead PI in the unidisciplinary model tends to carry the most weight, according to his or her preferences.

In addition, of course, it is also difficult and generally inadvisable to alter questions once the study data collection is underway.

YPP: The YPP study, as a counterpoint, cast a much wider net in its initial discussion on methodology. As noted earlier, a wide range of disciplines was reflected in the team membership. This was handled in practice by having each investigator initially develop a section of the questionnaire to capture their interests – child maltreatment, drug use, service delivery, violence, etc. We were also concerned with length, as our agency team members emphasized that youth could not be expected to take part in an interview for more than an hour and that their likely lack of literacy meant that every question would have to be read out carefully. We did a focus group test of an early draft and got very useful feedback from a group of street youth at our partner agency. Further piloting was carried out until the length was manageable. Some compromise was necessary to reduce each section of the questionnaire, and this was accomplished via our monthly meetings and shared understandings of what concepts and useful information were found in each section. Each area of interest could have been a questionnaire in itself, so the blending was essential.

Early group discussion also established that the YPP study would involve a mix of quantitative and qualitative methods. Since the study was longitudinal, it was important to repeat some of the same baseline questions at the 4th and 8th month interviews; however, we also reduced the number of questions to avoid subject fatigue and we decided mid-way to make the final 12th month interview a qualitative reflection by the youth on the past year. Unlike the questionnaires administered in the early stages, this final contact was tape-recorded and transcribed. Our YPP approach could perhaps be better described as a pluralistic methodology, one that did not achieve a complete "fusion" as portrayed by Wickson et al. (2006). However, we also would argue that our disciplinary boundaries were blurred, if not totally dissolved. In spite of the myriad disciplines represented in this project, there was certainly no sense of a hierarchy of disciplines, rather each team member provided a way to contribute to the research that would reveal important truths about the experiences of street-involved youth. Agency members participated on an equal footing. One example of this is how the questionnaire was changed with their guidance to include questions about transitioning away from CAS. Also noteworthy is how the methodology of the project evolved over its inception, planning, and implementation phases. We were able to have an ongoing feedback loop among investigators, the field workers, and agency staff as we discussed interview experiences in regular meetings. This enabled a flexible response to emerging situations. This was clearly an advantage over the more static DAVI study.

Collaboration

The third area to address is that of stakeholder involvement and collaboration more generally. All research projects involve some degree of collaboration – no researcher in urban health works alone. There are two levels to consider, one is the research team itself, its composition and interactions among members, and second

the collaboration with the broader community and stakeholder groups (Wickson et al., 2006).

DAVI research team: In the DAVI study, the research problem was complex, but as viewed from one disciplinary lens, its prime directive was to collect the required data as set out in the original proposal. The collaborative effort required among DAVI team members was directed at fulfilling the study design across the four participating sites with as much consistency as possible. This was done through regular monthly conference calls and annual meetings, but key decisions were reached by the lead investigators in each city, not by the team overall. Perhaps this is inherent in having an international study – is this in itself a barrier to a true TD approach?

YPP research team: For the first level, as described above, the YPP study team was highly collaborative in both its formulation of the complex research problem and in its responsive methodology due to the many disciplines and subspecialities represented on the research team. We had many members at the table, representing different audiences and disciplines, and it was imperative to agree on our goals and methods. Moreover, the interviewers themselves had to be trained in all aspects of the project and the way to approach the different questions with respondents. For example, the interviewers were somewhat anxious about asking about suicide and self-harm and were also concerned about how to respond if any youth showed these tendencies. A team member with research and clinical expertise in suicide and suicide prevention arranged for them to spend a day in his unit to receive input from trained staff in how to deal with any issues that might arise. This reassured them before embarking on the field work.

Another example of collaboration is how the child welfare (CAS) representatives were actively involved in providing clearance with frontline workers so that youth could be accessed from this source. In comparison to the DAVI team, the YPP team had the advantage of being in one location and thus were able to meet face-to-face monthly and have more in-depth discussions involving all team members. While disagreement certainly emerged, the process of resolution was less onerous and likely facilitated by the members' willingness to think outside their own disciplinary focus. In addition, although the members of the YPP research team came from different disciplinary backgrounds and research methodologies, these members came together because of a desire to collaborate and the understanding that multiple viewpoints and research interests would be expressed and compromise was to be expected. This in turn was enhanced by the applied problem focus of the study and the presence of community members. Thus, perhaps the diversity of the members' backgrounds made this group flexible; in contrast, the similarities among the DAVI members may have made it more difficult to resolve issues when an alternative suggestion or approach was considered, as there was less 'bend' in the group members.

DAVI stakeholder groups: The two studies also took quite a different approach to stakeholder involvement. The DAVI study needed to access public schools, youth correctional institutions, and community agencies. These all involved time-consuming, quite formal processes for permission to administer questionnaires and

make contact with youth for the interviews. However, input from these various official staff was not sought for content or any aspect of study design. Our audience was seen as primarily an academic one. When the Toronto DAVI study was complete, we were invited to make formal presentations at the municipal, provincial, and federal levels (Butters & Erickson, 2005; Erickson & Butters, 2004, 2006). Some of our publications have looked explicitly at the drugs–weapons–violence relationships in our data, and our studies have been cited in policy papers. But despite the rising wave and concern with gun-related incidents involving young people in Toronto, team members were not invited to participate in local task forces examining responses to this issue (Wortley & Falconer, 2008). We are not sure how to interpret this, but it is possible that we are viewed as "arm's length" academics without much practical advice to offer; as well, it may be that key officials in the community did not feel they had any explicit stake in our research. This is possibly the fate of a typical unidisciplinary study that does not involve community members at the outset in the formulation of the study and research questions that are of particular interest to the community.

YPP stakeholder groups: In contrast, the YPP study engaged with the community from the start. We planned it in a way so that many stakeholders would use and apply the data we collected for treatment programs, services, and policies around homeless youth. When we completed our data collection, we held a workshop to present our preliminary findings to a broad range of frontline workers, academics, and policy staff from the community, both locally and federally. A representative of our funding source came from Ottawa to attend the workshop. We made several local and national poster and talk presentations, and an invitation to speak at Health Canada led to the posting of a study overview on the National Crime Prevention Centre's web site as well (Erickson, 2008). The results have also been fed back into child welfare agencies through our team members, and a recent conference with policy makers highlighted some of our findings (Fidler, Erickson, & Butters, 2009). Overall, we seem to have many more links with relevant stakeholders who are aware of YPP and its findings than is the case with the DAVI study. Again, this may be in part because YPP was funded nationally and focused locally with more accessible partners. It reflects many of the positive aspects of TD.

A further extension of stakeholder engagement is the extension of the project to the youth themselves, to consider their experiences directly. This opportunity came about via our web-based story telling project with street-involved youth, Toronto Youth Street Stories (TYSS). We sought funding in part because in the YPP interviews we were very impressed with how articulate and expressive the youth were. In this separately funded but related project, the research team worked closely with agency staff to set up the arrangements for a safe, positive atmosphere where youth could participate if they wished. Youth were invited to come to several author-led workshops and create poems, stories, and art about their lives before, during, and possibly after their time on the streets. They responded with enthusiasm and their contributions in their own words, along with some YPP research reports, were placed on the TYSS web site (www.tyss.org). Although it is dissemination more than a research project, it illustrates a way in which at-risk youth can actively

collaborate in a real-world situation and produce different kinds of "data" than a conventional study (Erickson, King, Ross, & Wekerle, 2009; Ottaway, King, & Erickson, 2009). Though TYSS was not part of a specific intervention, such as one to address drug use in this population, a harm reduction program could more readily be part of such an undertaking where youth are already engaged than in one that simply tries to impose treatment on youth "for their own good" (Paterson & Panessa, 2008).

Conclusion

In conclusion, while both DAVI and YPP collected worthwhile and interesting data on the drug use and dependence profiles of at-risk youth, they differed in their approach to defining the problem, methods, and collaboration among the team members and with stakeholders. The YPP study was more inclusive, flexible, and adaptive to circumstances in the field. The results to date are reaching a wider range of stakeholders.

With a couple of caveats, we would argue that the methods of TD research produced a more viable and useful set of data for urban health researchers. First, DAVI is in many ways easier to "package" for journal articles in the fields of criminology and addictions. At YPP, we are still working out the best ways to divide the data and present them to a variety of audiences. In a sense we are reverting at the publication level to a more unitary format. To date, the presentations and papers that have stemmed from this work have tended to utilize individual groups of variables in the data set rather than reflect cross-disciplinary analysis (i.e., drug items or maltreatment items but not in conjunction with each other). Perhaps if we had truly "fused" our various disciplinary approaches into one shared conceptual framework (Rosenfield, 1992), we might find it easier to present our findings to non-specialist (or TD) audiences, but in what journals would we publish them? Further, while there may be tacit support for TD research expressed in the university setting, professional recognition, grants, and promotion remain largely linked to disciplines. Where then is the professional motivation to pursue TD funding and outlets if these initiatives are less valued in university and research settings?

Second, it may be that a large-scale, multi-national project such as DAVI is less amenable to TD methods, given the nature of funding requirements and production of "deliverables" to the granting agency and the academic community. Time is also a factor. Distances and the limits of impersonal communication can hinder the kind of merging of viewpoints that TD requires. Nevertheless, we are convinced that the TD direction was the optimal approach for the methodology of the YPP study. Its local origins, evolution in methods, and ongoing generation of knowledge are reaching a variety of audiences concerned with improving inner-city health services and delivery to at-risk youth.

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Chapter 8
Collaborative Processes in Transdisciplinary Research

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> *The specialization, then, that has made possible the progress of experimental science during a century, is approaching a stage where it can no longer continue its advance unless a new generation undertakes to provide it with a more powerful form of turnspit . . .. For science needs from time to time, as a necessary regulator of its own advance, a labour of reconstitution, and as I have said, this demands an effort towards unification, which grows more and more difficult, involving, as it does, ever-vaster regions of the world of knowledge.*
>
> – José Ortega y Gasset (1930/1932) "The Barbarism of Specialization," *The Revolt of the Masses*

It has been widely acknowledged in recent years that if we are to achieve a coherent comprehension of the world and its enormous social, environmental, and public health problems we must make linkages between bodies of scientific knowledge and the social and political realities that generate them. Nearly eight decades after Spanish philosopher Ortega y Gasset noted the limits of specialization and the organization of knowledge into rigidly defined disciplinary boundaries, transdisciplinary (TD) collaboration is coming to be recognized as an essential strategy for understanding and resolving the complex urban public health challenges of our time (e.g., health disparities, AIDS, and heart disease). The past two decades have brought a surge of public and private investments in large-scale, multi-year TD research initiatives (Kahn, 1993; Kahn & Prager, 1994; Nass, Stillman, & Ebrary Inc., 2003; National Academy of Sciences, 2003; National Institutes of Health, 2003; Pellmar & Eisenberg, 2000; Stokols, Hall, Taylor, & Moser, 2008; Wuchty, Jones, & Uzzi, 2007). At the same time, the importance of evaluating the intellectual and societal contributions of TD initiatives has become increasingly evident (Abrams, Leslie, Mermelstein, Kobus, & Clayton, 2003; Brainard, 2002; Rhoten & Parker, 2004), giving rise to a new field – the *science of team science* – uniquely concerned with understanding and enhancing the outcomes of TD research and training initiatives

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(Hall, Feng, Moser, Stokols, & Taylor, 2008; Kessel & Rosenfield, 2008; Klein, 2008; Nash, 2008; Stokols, Misra, Moser, Hall, & Taylor, 2008).

Within the rapidly emerging science of team science, a growing number of studies focusing on the processes and outcomes of TD collaboration suggest that the levels of effectiveness of team science initiatives are highly variable and depend greatly on contextual circumstances (see Stokols, Misra et al., 2008, for review) and *collaborative readiness and capacity* factors (e.g., Hall et al., 2008; National Academy of Sciences, 2005; Rhoten, 2003; Stokols, Harvey, Gress, Fuqua, & Phillips, 2005). This chapter presents a concise overview of the characteristics and scope of TD collaborations and discusses findings related to the collaborative processes necessary to facilitate and conduct TD research. We also propose strategies for enhancing collaborative effectiveness and directions for future research in the study of TD research.

Characteristics of TD Research Initiatives

The ensuing discussion employs Rosenfield's (1992) and others' (Klein, 2008; Lawrence & Despres, 2004; Nash, 2008) distinction between various forms of *cross-disciplinary* (CD) research, encompassing *multidisciplinary* (MD), *interdisciplinary* (ID), and *transdisciplinary* (TD) research, in which the least integrative form is MD collaboration and the most integrative is TD collaboration. Whereas participants in MD and ID collaboration remain conceptually and methodologically anchored in their respective fields (though there is some exchange of diverse perspectives in these forms of collaboration as well), TD collaboration is characterized by the development of shared conceptual frameworks that integrate and transcend the individual disciplinary perspectives represented by the team members. Therefore, although many of the concepts discussed in this chapter apply across the CD spectrum, the degree to which these collaborative factors are salient to the success of a TD project or center is intensified due to the increased complexities associated with conducting TD research.

In addition to the distinction between various forms of CD research, collaborations can be compared along three dimensions of *integrative scope* (Stokols, 2006): *organizational, geographic, and analytic*, ranging from narrow to broad. In terms of their *organizational scope*, TD collaborations can be *intra-organizational* alliances whose members work within a single organization; *inter-organizational* collaborations, which span multiple organizations; or *inter-sectoral* partnerships, which include participants spanning multiple municipalities, regions, or nations. Similarly, TD collaborations can vary based on the *geographic scope* of the initiative ranging from local groups to community, regional, and national/global contexts. Across the various levels of organizational and geographic scope, participants in TD teams may be co-located at a single university or research institute or they may collaborate across several spatially and temporally dispersed locations.

Depending on the nature of the scientific or community problem being addressed by the team, the *analytic scope* of TD collaboration ranges from *molecular* (e.g.,

neuroscience) to *molar* (e.g., public policy) levels of analysis. A wider range of disciplinary perspectives and professional viewpoints must be integrated to achieve a TD approach to a particular problem as the analytic scope of the project moves from molecular to community levels. Collaborations that have broader organizational, geographic, and analytic scope are likely to encounter a larger and more complex array of constraints and challenges as they pursue their scientific and community problem-solving goals (Stokols, 2006; Stokols, Misra et al., 2008).

Team science programs are often undertaken to address certain priorities among the multiple potential outcomes of TD collaboration. Some of these priority goals include scientific discovery, the training of TD scholars, and the development of clinical, public health, and policy interventions. For instance, collaborative initiatives such as the NIH Clinical Translational Research Centers (CTRC) and the Centers for Population Health and Health Disparities (CPHHD) emphasize community-based participatory research in addition to basic medical and behavioral research as a criterion for effective collaboration among university researchers and community-based health practitioners as they work together to develop and implement evidence-based disease prevention programs (Minkler & Wallerstein, 2003; National Institutes of Health, 2002; Zerhouni, 2005). Other team science programs, by contrast, devote little time and resources to the translation of scientific research into clinical practices and, instead, place greater priority on scientific discovery and intellectual integration.

The content and relative importance of the collaborative goals of TD projects may be *phase specific* (Stokols, Misra et al., 2008) and, thereby, change over the course of an initiative. For example, greater emphasis may be given to training and basic research during the initial stages of a team science project, whereas the intermediate and longer term phases of collaboration may assign greater priority to translating scientific knowledge into community interventions and policies aimed at improving public health.

Since the mid-1990s, a growing number of studies (Gray, 1999; Kessel, Rosenfield, & Anderson, 2008; Klein, 1996; Morgan et al., 2003; Stokols et al., 2003, 2005) have assessed the processes and outcomes of TD research centers as their members collaborated on a variety of scientific topics (e.g., reducing cancer incidence, morbidity, and mortality associated with obesity and low levels of physical activity; the genetic and dispositional bases of nicotine addiction and tobacco use) over a period of several years. The next section identifies broad themes that emerged from a review of research examining factors found to facilitate or constrain team science programs across a variety of community and institutional settings.

Processes of TD Research Initiatives: Collaborative Readiness and Capacity Factors

One of the broad themes that has emerged from earlier studies of TD research initiatives is the influence of certain *collaborative readiness* factors (Fuqua, Stokols, Gress, Phillips, & Harvey, 2004; Hall, Stokols et al., 2008; Kessel et al., 2008; Olson

& Olson, 2000; Stokols, 2006; Stokols et al., 2003, 2005; Stokols, Misra et al., 2008) on the success of the team science program. *Collaborative readiness* factors refer to antecedent conditions that exert a disproportionately high influence on the success of TD collaborations, especially during their initial stages (e.g., during proposal development, preparations for project launch once funding is received, and the initial months of the project once it has commenced). However, it is important to note that these factors are not only influential at the outset of collaboration but are dynamic and malleable and continue to play a critical role across the duration of the project. Specifically, these factors, as they become enhanced or diminished over the course of a project, are referred to as *collaborative capacity* factors (Hall et al., 2008). Stokols, Misra, et al.'s (2008) review of the contextual factors that influence the effectiveness of TD collaboration suggested that collaborative effectiveness encompasses multiple dimensions including intrapersonal, interpersonal, organizational, structural, societal, and scientific domains (see Hall et al., 2008; Hays, 2008).

Intrapersonal Factors

Intrapersonal collaborative readiness and capacity factors, essential for the success of team science initiatives, include members' preparedness for the complexities and uncertainties of TD work (Stokols, 2006); their openness toward new disciplinary and methodological perspectives and worldviews (Israel, Schulz, Parker, & Becker, 1998); their willingness to devote substantial amounts of time to learning about others' expertise; valuing collaboration and embracing a TD ethic (i.e., a strongly held commitment to engaging in collaborative research and an openness to integrating diverse disciplinary perspectives and levels of analysis) (Stokols, 1998; Stokols et al., 2003; Wray, 2002). Another important intrapersonal factor found to increase members' readiness for effective teamwork is the extent and quality of team members' past collaborative experiences with each other and their experience with TD collaboration in general. Team members who have had positive collaborative experiences with each other in the past may not have to spend as much time establishing and sustaining trust as compared to teams whose members begin collaborating with little or no history of working together on prior projects (Cummings & Kiesler, 2008); Hall, Stokols et al., 2008; Israel et al., 1998; Lantz, Viruell-Fuentes, Israel, Softley, & Guzman, 2001; Stokols, 2006; Stokols et al., 2005).

Finally, a number of studies suggest that collaborative versus non-collaborative leadership styles play a crucial role in determining the success of TD initiatives (Gray, 2008). Leaders who are transformational in their style, inclusive, empowering, adept at negotiating and resolving conflicts, and offer constructive feedback and encouragement to colleagues are able to augment trust and cohesiveness among team members and achieve high levels of performance (Bennis, 1997; Israel et al., 1998; Kumpfer, Turner, Hopkins, & Librett, 1993; Stokols, 2006). Similarly, *dynamic leadership* styles in which members share authority and responsibility according to the shifting requirements of their tasks have been found to lessen

pressures felt by individual leaders and foster inclusiveness in collaborative settings (Kayes, Kayes, & Kolb, 2005).

Interpersonal Factors

Earlier studies have found that one of the most critical *interpersonal* determinants of collaborative effectiveness is mutually respectful and constructive interpersonal communication (Fiore, 2008; Kahn, 1993; Stokols et al., 2003, 2005). Regular and constructive intellectual and social communication fosters trust and cohesion and is necessary to strengthen collaborative processes and ease TD tensions. Moreover, ongoing communication is essential for conducting effective TD research in that it allows for the refinement and clarification of goals, roles, and task requirements and helps build a shared vision and identity (Stokols et al., 2008). Through this interaction, members have the opportunity to understand and appreciate their colleagues' perspectives and worldviews and eventually integrate and transcend disciplinary boundaries to develop novel conceptual frameworks for understanding and solving complex problems.

Organizational Factors

It is important that participating organizations recognize and reward members for engaging in collaborative activities by providing organizational, environmental, and technological support. There are a number of areas where supportive institutional policies and activities can impact the ease, productivity, and effectiveness of collaboration. Examples include division of overhead and cost sharing across entities or departments and providing administrative support for the increased coordination and maintenance of budgets and subcontracts that come with conducting multi-departmental or multi-institutional research.

The presence of strong organizational incentives is another important factor in TD research (Butterfoss, Goodman, & Wandersman, 1993; Israel et al., 1998). Team science projects require members to devote substantial amounts of start-up as well as on-going time for meetings and brainstorming sessions, to engage in multi-authorship publications, and to develop written products that reach journals across disciplines and perhaps even beyond scientific venues (e.g., policy briefs) in order to maximize the impact of the research endeavor. Traditional academic criteria for promotion and tenure typically emphasize high levels of productivity early in an investigator's career, as evidenced by single or first authorship on articles that appear in prestigious, discipline-specific journals. Therefore, providing greater recognition for collaborative work through changes in university tenure and promotion policies can be an important incentive for enabling junior researchers to participate actively in TD research and training activities (National Academy of Sciences, 2005; Rhoten & Parker, 2004). Similarly, non-hierarchical organizational structures and routines that encourage participatory goal setting and decision

making can foster inclusiveness among team members thereby increasing institutional support for intradepartmental and inter-university collaboration (Morgan et al., 2003).

Structural Factors

Among the *physical-environmental* and *technological* collaborative readiness and capacity factors that have been found to encourage communication, trust, and integration of intellectual ideas is the spatial proximity of team members' offices and laboratories (Miller, 2008; Stokols, 2006). In fact, one early study found that beyond distances of 30–50 m collaboration among coworkers working in the same facility decreased markedly (Allen, 1984). In the case of remote collaborations, where such an arrangement is not feasible, it is especially critical that participating sites have access to the necessary electronic infrastructure such as broadband electronic networking capabilities, linkages between sites, and other technical support. Additionally, data security, privacy provisions, rapid retrieval and long-term archival access to data, and technologies that facilitate the formation of knowledge and social networks have been found to enhance remote scientific collaborations. Another factor found to be directly related to the collaborative success of remote TD teams is team members' *technological readiness*, including their familiarity with various electronic information and communication tools, protocols, and codes of conduct, and the effectiveness of their communication styles (Cummings & Kiesler, 2008); Lipnack & Stamps, 1997; Miller, 2008; Olson & Olson, 2000; Sonnenwald, 2007).

The availability of opportunities to meet and communicate, especially at the outset of a collaborative initiative as well as at regular intervals through face-to-face meetings, social gatherings, and retreats has been found to facilitate interpersonal trust and reduce conflict and social fragmentation among the members of distance collaborations (Rocco, 1998; Stokols, 2006). Furthermore, studies of team environments suggest the importance of providing participants access to distraction-free workspaces and comfortable meeting areas to facilitate participation in both individualized tasks requiring high levels of concentration or confidentiality and group activities requiring high levels of coordination (e.g., discussions and brainstorming sessions) (Brill & Weidemann, 2001; Steele, 1986; Sundstrom, DeMeuse, & Futrell, 1990).

Societal and Scientific Factors

At the state/provincial, national, and international policy-making levels, easing of political barriers and the reduction of tensions between nations, enactment of protocols for ensuring ethical scientific conduct, adjudicating claims to intellectual property ownership and licensing, and protecting animal and human subjects' rights provide the social, political, and legal foundations for initiating and sustaining effective large-scale TD collaborations (Cohen & Linton, 2003; David & Spence, 2003; Havemann, 2001; Klein, 2004; Sonnenwald, 2007). Moreover, various scientific

fields may differ in terms of the extent to which they are ready for integration with other disciplines, depending on the depth and maturity of prior basic research efforts within each field (see Hays, 2008). Specifically, if particular areas of science are not compatible in terms of ideology, conceptualization, and support structures (e.g., methodology, terminology), then TD collaboration may not be feasible.

Whereas many contextual factors contribute to collaborative readiness, the capacity of a TD team to sustain effective collaboration over extended periods depends to a large extent on how well team members are able to manage the substantial amounts of new information and communications they are exposed to as they work with colleagues trained in multiple fields, many of whom may be dispersed across several geographic locations. Little research attention has been given to the challenges of managing information and communication overload in TD team science initiatives despite the fact that it has been shown to adversely affect productivity, effectiveness, decision making, health, and personal relationships in many organizational and occupational settings (e.g., Bawden, Holtham, & Courtney, 1999; Farhoomand & Druiy, 2002). Some important facets of this problem are considered below.

Information and Communication Overload in TD Research

Conducting TD research requires a willingness to consume and manage large amounts of new information. In addition to keeping up with the growth of information in their own respective fields, it is also necessary to master and bridge often unfamiliar fields of research. While information overload also occurs in unidisciplinary research (Wilson, 1996), the scope and the intensity of the amount of new information are distinct in TD research. This constant barrage of information is associated with a number of negative outcomes including suboptimal decision making and decreased productivity, difficulties in identifying and selecting relevant information, ignoring information and being too selective in processing information and communications, experiencing perceived loss of control over information and communication, and increased errors, stress, confusion, and cognitive strain (Bawden et al., 1999; Eppler & Mengis, 2004; Farhoomand & Druiy, 2002; Mark, Gudith, & Klocke, 2008; Misra, 2010).

TD collaboration is especially challenging for geographically dispersed teams. Individuals may be required to become proficient in new kinds of information and communication technologies (e.g., video conferencing, online meetings, and electronic discussion boards). Moreover, large-scale TD collaborations require team members to manage substantial volumes of e-mail; print and archive e-mail communications, and digitized attachments; pull and share information with other team members in a timely manner; deal with feelings of alienation when information is distributed unevenly among team members; cope with the depersonalizing qualities of computer-mediated communication; and resolve glitches in communications technologies as they occur over the course of a collaborative project (Finholt, Rocco,

Bree, Jain, & Herbsleb, 1998; Olson & Olson, 2000; Sonnenwald, 2007). This source of communication-based overload can have important implications. Recent studies of knowledge workers indicate that their workplace and organizational routines have become increasingly fragmented, in that they frequently switch among multiple tasks and encounter many interruptions owing to their dependence on the Internet and wireless communication strategies (Gonzales & Mark, 2005; Mark, 2002; Mark, Gonzalez, & Harris, 2005; Mark et al., 2008; Su & Mark, 2008). Even when participants work together within a single organization, members must participate in additional center-wide meetings, events, and working group sessions above and beyond their regular organizational responsibilities, which can heighten the sense of overload experienced by team members.

The preceding review of the collaborative processes of TD research and information and communication-based overload in TD research reveals that TD teams are often susceptible to intrapersonal, interpersonal, organizational, and structural barriers and are prone to interpersonal tensions, conflict, and social fragmentation across the duration of the collaborative process (Stokols, Misra et al., 2008). Examples of the challenges and constraints faced by TD research teams are described in further detail in Chapter 2. The next section reviews a variety of strategies to help mitigate these challenges and promote sustained and effective TD research.

Strategies for Encouraging and Sustaining Effective TD Collaborations

Intrapersonal Strategies

At the intrapersonal level, there are a variety of techniques individuals can implement to deal with information overload. Individual coping repertoires such as personal information management and organization styles (e.g., routines for "going off-line" at regular intervals, strategies for sorting and responding to e-mail messages, taking regular breaks from computer or digital communication-related activities) have been found to mediate the effect of cyber-based sources of overload on stress. That is, individuals reporting higher levels of coping capacity experienced lower levels of stress associated with cyber-based overload as compared to those who reported lower levels of coping capacity (Misra, 2010).

Interpersonal Strategies

There are a number of strategies to enhance effective communication and resolve interpersonal team conflict within TD teams. Appreciative inquiry (AI) is a process that aims to enhance collaborative effectiveness through an exploration of the strengths and successful experiences of the members. Therefore, rather than

focusing on the challenges of the collaboration, AI begins with an analysis of what is working within the group and then uses that information to engender change (Cooperrider & Srivastva, 1987). Appreciative inquiry approaches have been found to foster trust and build relationships among team members. Another method to build team unity and reduce conflict is the use of seminar programs aimed at facilitating knowledge transfer and shared language development. This can help reduce tensions related to opposing scientific perspectives and language and knowledge barriers that often exist when members from differing disciplines collaborate.

Oftentimes the source of interpersonal tensions originates from the lack of clearly defined expectations at the outset of collaboration. Delineating expectations through a scientific *prenuptial agreement* or *terms of reference* in the shape of a formal written contract or verbal discussion can help resolve issues such as authorships, roles, goals, and execution of the project before they become sources of conflict (Gadlin & Jessar, 2002). Expectations and policies can also be outlined at the outset through the creation of operation manuals and publication guidelines.

Organizational Strategies

Strategies to overcome organizational barriers to TD collaboration include *university-level* measures such as those recommended by the University of California (UCI), Irvine task force for identifying barriers to multidisciplinary research (Hamkalo et al., 2000). The UCI task force recommends that the personnel recruitment and review processes need to be sensitized to the issues participants encounter in TD research. Specifically, chairs and deans of departments should monitor faculty members' individual contributions to collaborative research projects and ensure that such contributions are fully acknowledged. It is also recommended that the administration be made more aware of the benefits and needs of TD research so that team science activities can be a priority on university and departmental agendas.

In addition to identifying funding sources for TD research projects, the UCI task force recommends stimulating interactions and discussions among faculty across departmental and disciplinary lines through regular meetings and retreats, arranging for dedicated resource persons to mediate discussions between potential collaborators and guide faculty through multi-investigator proposals and agency requirements, and negotiating agreements for cost sharing, space, and staff commitments between faculty and deans of departments.

Since multi-investigator projects involving more than one academic unit pose special problems for ensuring fiscal responsibility, the task force recommends the development of campus policy statements concerning the management of such projects as well as written agreements about responsibilities, requirements, timelines for submission of data, and final reports among participating academic units.

Similar reforms to faculty appointments, tenure, and promotion policies at the *department level* have been made in the University of North Carolina (UNC), Chapel Hill School of Medicine (Orringer, 2008). Since it has been recognized that interdisciplinary research is increasingly important for the future of biomedical

science, committees are instructed to consider UNC faculty members' contributions to such collaborative projects in terms of their role in the project as well as the indispensability, originality, and creativity of their contributions. The policy states that as part of the review process, information about the faculty members' contributions to such projects should be solicited from principal investigators, project directors, and others who have first-hand knowledge about the faculty member's role. Such policies are vital since the extent of alignment between university-level and department-level policies to promote TD collaboration is an important factor influencing the effectiveness of such collaborations (Stokols et al., 2003).

Structural Strategies

Structural strategies for encouraging team science programs occur primarily at the technological and physical-environmental levels. State-of-the-art technology can enhance collaborative capacity, but maintaining up-to-date equipment and software is important for ensuring that collaborative groups (especially dispersed groups) are able to communicate and share data efficiently. This can be accomplished by leveraging institutional resources (e.g., software licenses available that may not be widely publicized) and using free or low-cost web tools such as social networking sites and wiki pages. Additionally, efforts should be made to maximize and strategically consider the use of space by reorganizing when possible to ensure sufficiently large, proximally located office and laboratory spaces for team members.

Societal/scientific strategies: Despite the challenges at the societal and scientific levels, efforts have been made to promote effective TD work (Gruman & Prager, 2002). Importantly, broader level changes have relied upon gradual but steady progress at intrapersonal strategies, interpersonal readiness, organizational reform, and a call from the scientific communities and public health at large. One strategy for systematic and broader level change is to institutionalize the stakeholders' role in setting research priorities and garnering funding support (Gruman & Prager, 2002; Hall, Feng, et al., 2008). Within this process it is imperative that all relevant parties are engaged in the decision-making process which includes not only scientists but also health-care personnel, clinicians, patient advocacy groups, the pharmaceutical industry, business, and the general public. The incorporation of different stakeholders' perspectives is inherently a collaborative process in its own right and can ultimately speed up the "discovery to application" and public health impact processes.

Another broader level strategy is to mandate coordination among the scientific community, health-care system, industry and business as well as cross-agency collaborations through government policies (Gruman & Prager, 2002; Shen, 2008). A systematic link within and across various agencies, scientific and non-scientific communities with shared resources, languages, and accountabilities will ensure that TD collaboration is being executed with a common vision, shared goals, and responsibilities. Finally, it is becoming ubiquitous to build cultural literacy and

capacity among different stakeholder groups in order to function effectively in an increasingly inter-connected global community.

Summary and Conclusions

This chapter provides a review of the research on collaborative processes (i.e., collaborative readiness and capacity factors) associated with TD research initiatives. A relatively neglected challenge associated with TD collaborative work – information and communication overload – was introduced and elaborated. Further, strategies for enhancing collaborative effectiveness and translating scientific knowledge into health-promotive community interventions were proposed.

In sum, the preceding review of collaborative processes of TD team work suggests that the contextual factors most crucial to collaborative effectiveness are highly variable and depend on the type (e.g., scientific versus translation aims, narrow versus broad geographical scope, and narrow versus broad disciplinary orientation) and phase (e.g., research, training, or translation of scientific knowledge into community-based interventions) of the collaborative activities. At the same time, certain contextual and situational factors such as empowering leadership, members' collaborative readiness, and regular and effective communication emerged as important factors influencing the collaborative success of TD teams across a broad array of collaborative settings. Moreover, these contextual factors may influence team processes and outcomes interactively or cumulatively (Altman, 1995; Stokols, 2006). These findings suggest the value of optimizing as many factors as applicable to particular TD initiatives by matching the specific goals and structure of the TD research program with targeted investments in those contextual resources that are deemed most essential to its effectiveness.

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Chapter 9
From Complex Problems to Complex Problem-Solving: Transdisciplinary Practice as Knowledge Translation

Kelly Murphy, Beverly Wolfus, and Aisha Lofters

In this chapter, we explore how the transdisciplinary (TD) paradigm can advance knowledge translation (KT) related to complex inner-city health problems. KT is an emerging discourse within health and social research communities. The overriding concern in KT is to increase the use of research evidence in practical decision-making contexts. A range of conceptual frameworks has been developed to better understand effective KT processes. However, little attention has been paid to KT opportunities that may arise through TD research.

Transdisciplinarity is a highly promising approach for investigating complex urban health problems, for assessing the efficacy of complex interventions, and for substantive knowledge sharing across disciplinary boundaries and professional cultures. In the collection of chapters here, involvement of practitioners, policy makers, and community partners, in addition to academics, has been emphasized as an important characteristic of TD knowledge synthesis that strengthens the quality of inquiry. This incorporation of a range of urban health collaborators shows how transdisciplinarity is closely linked to the approach of community-based participatory research (Wallerstein & Duran, 2003).

In many such projects, however, transdisciplinarity is presented as a collaborative *research* strategy that essentially ends when KT begins. What can be missed here is that the TD approach and TD teams also open up important opportunities for promoting 'praxis' or the integration of inquiry and action to advance social change. In our view, this is the ideal characterization of KT. We propose that a commitment to transdisciplinarity shortchanges its own transformational potential if it is defined exclusively as a research process and not also as a robust KT framework to facilitate evidence-informed policies and practice.

Other chapters in this book reflect the perspectives of researchers who have participated in TD partnerships for the purpose of generating more comprehensive knowledge of complex urban health issues and interventions. The discussion here proceeds from the perspectives of three 'knowledge brokers' who work to increase practical use of research knowledge for urban health and well-being. One of us

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(Beverly) is based in a government ministry responsible for social welfare policies. She has over 15 years of experience in supporting policy-makers' use of evaluation and research for decision making. Another author (Aisha) is a family physician and PhD candidate who conducts epidemiological research on primary-care barriers faced by recent immigrants. Our moderator (Kelly) is responsible for facilitating and teaching KT at an urban health research center. Our different locations in the KT process (e.g., policy supporter, researcher, facilitator) afford a breadth of perspectives on how KT works. In our discussion we draw on our diverse experiences of TD and community-engaged research partnerships with the aim of identifying core competencies (e.g., knowledge, skills, attitudes) for doing effective urban health KT. We also explore how these competencies can be developed among TD researchers through a case example. The KT competencies we discuss include policy knowledge, knowledge of stakeholder priorities, skills to communicate effectively across professional cultures, and positive attitude toward communicative intent and collaboration. All of these competencies, we suggest, are also vital for effective TD research related to urban health and may be fostered through TD partnerships and training experiences. It is our position that KT should be conceived of as intrinsic to and a natural extension of TD work rather than as a separate set of activities.

We have chosen to use the dialogic form, rather than the standard form of an academic essay, for a number of reasons. The first reason is to show how KT practitioners and TD partners can mobilize alternative writing approaches that may be more accessible to non-scholarly audiences. The second is to reflect our adherence to the idea of transdisciplinarity as generative knowledge exchange. Quite literally, we understand the promise of transdisciplinarity and KT in terms of multidirectional conversation rather than unidirectional presentation. In TD dialogue, it should be possible to move beyond the goal of explaining *my* meaning to *you*, and to generating new meanings collaboratively through the interpenetration of our knowledge and experiences (Fuller, 1998). This orientation to KT has its roots in transformational educational theories informed by Dewey's reflective inquiry (Dewey, 1938/1997).

Getting a Handle on KT

Kelly: Thanks to both of you for agreeing to have a conversation about transdisciplinarity and KT. We should probably start by looking at the terminology, since there's been an explosion of KT definitions and frameworks recently, particularly within the health sciences. We hear about *dissemination, knowledge transfer, knowledge translation, knowledge mobilization, linkage and exchange*, just to mention a few of these terms. All of these approaches share the same objective: to increase the likelihood that scientific evidence will aid in practical problem-solving and policy development. Do the terminology differences matter much?

Aisha: I think the differences matter because different KT frameworks encourage different practices. And these practices can vary quite a bit, from reporting on research findings in short, accessible, 'lay summaries' for decision makers, to mobilizing influential 'champions' to encourage use of the research findings in their home

contexts. These sorts of 'dissemination' activities usually occur at the end of the research project. There are also activities to pursue when a project starts, like involving decision makers in framing research questions and 'strategic priority'-focused requests for proposals. These are 'linkage and exchange' activities and they have a different goal, to increase the relevance of the research to on-the-ground problems.

Beverly: There's also the 'linkage and exchange' approach of hiring research staff directly into policy departments. This strategy is aimed at increasing relevance and encouraging understanding and uptake. Do the different KT terms matter? I don't think the differences are particularly important. There are some groups who would say that 'knowledge *transfer*' refers to unidirectional transmission of information from the research community to practice, whereas 'knowledge *translation*' refers to an exchange of information and more dialogue among communities. In the ministry I work for, we are talking about *knowledge mobilization* (KM) rather than knowledge transfer *or* translation, which are common terms in the health sector. To us the term *mobilization* signals that we're emphasizing the *use* of research findings versus simple knowledge sharing. But that could just be semantics, since I know that KT implies use of research as well. You know, there are times when I'd like to get away from the jargon altogether and simply talk about *learning*. What's important to me is that my colleagues in the ministry have a chance to learn what new research has uncovered, to learn what kinds of research methods can answer what kinds of questions, and to learn to use research evidence as input in shaping the work that we do. We've gotten away from talking about 'KT events' when we host gatherings for researchers and policy staff. We prefer to call them 'learning sessions.' People understand what learning means, even when they aren't familiar with the terms KT or KM.

Aisha: It seems like we need to do better KT about KT. Or maybe we should forego the KT labels altogether. I like your proposal to talk about learning instead of KT, Bev.

Beverly: One of the problems we face in communicating across professional boundaries is that people use words differently and often it takes quite a while for any group coming together for a common purpose to sort out what they mean by the terms they use. This is certainly the case when it comes to talking about KT because most KT thinking has happened in the health sector, not the social services sector. The concepts are much newer to us. As I said, we have been using the term '*knowledge mobilization*,' but this is causing some difficulty because sometimes what people hear is '*knowledge management*' and immediately think about records management and library functions. For now, we are staying with the term, hoping that a general understanding develops.

The strategy we are using to make knowledge mobilization is to talk more about the activities and the objectives of KM. For example, I really like the ideas underpinning '*Integrated KT*,' although it might be better to talk about *integrated research*. Some KT approaches are solely focused on sharing results after the research project is over. In these cases, research activities, like developing the questions and the protocol and collecting or interpreting data, may be completely unaffected by the KT objectives, and there may be minimal or no contact at all between the researcher and

the organizations responsible for policy or practice decisions until after the study is finished. Then outreach activities are started. In contrast, under the *integrated KT* model, the work of research is being done differently at every stage, because potential users of the research are involved in directing the research process and in sharing the results with stakeholder audiences. Under this model of KT, we all share in the work and the benefits of the work.

Aisha: Jonathon Lomas at the Canadian Health Services Research Foundation coined the expression, *linkage and exchange* to get at this idea of ongoing, or integrated, KT collaboration between researchers and decision makers (Lomas, 2000). The Canadian Institutes of Health Research (CIHR) describe the collaboration this way:

> Researchers and knowledge users work together to identify research questions, decide on methodology, interpret findings, and disseminate findings. Integrated KT aims to produce research results that are highly relevant and likely to be used by knowledge users to improve health and the health system (Tibelius & Stirling, 2007)

Kelly: This sounds to me like a close-to-perfect definition of transdisciplinarity. Even though many TD partners may not think of their work as KT, when we're talking about working from a TD approach, we're talking about bringing together diverse skills and knowledge to solve a problem.

Aisha: In my experience, it seems that TD partnerships have been focused on asking research questions rather than on *problem-solving* projects, which is how I like to think of KT.

Beverly: True. Establishing a TD research partnership doesn't automatically mean you have a KT relationship. The goal of the partnership matters. Are you working together to create a better research study or are you working together so that stakeholders can use evidence to guide their work? It's ideal when they merge these goals but it's definitely not inevitable. So being explicit about your motivations is important. When there isn't a shared vision about why researchers and non-researchers are collaborating, the relationship can get into trouble.

Aisha: Half the challenge may be just knowing what *is* my motivation? I think that most researchers would say that they want their work to be relevant to stakeholders. But what does that mean in practical terms? Does it mean that they want a full and equitable integrated KT partnership, with stakeholders involved in setting the research priorities? That makes the research harder to do, longer to do, and it can be frustrating. Developing a detailed *terms of reference* about how TD partners will work together, what the project activities will be, and what will constitute success or project completion is probably a good start. For example, will we say the project is finished when a scientific manuscript has been developed? Or is there an ongoing responsibility to make community presentations about the results or to participate in stakeholder meetings? KT is a process that can extend for a long period of time. The team needs to make decisions from the outset about parameters and responsibilities to the project over the long term. Unfortunately, there aren't a lot of models for how to do this.

Kelly: The action-research approach can help here, in supporting TD collaborators to think about and conduct their projects as *both* good research and

good KT. Action-research bridges the gap between looking at a problem from multiple standpoints (i.e., transdisciplinarity) and actually getting into the messy business of solving the problem (Reason & Bradbury, 2007). The idea is to act on research findings, then to use research methods to assess your effects of your intervention, and then to act again on the implications of those findings and so on. Ian Graham's team made some very interesting advancements along these lines with their KT model called the *knowledge-action cycle* (Graham et al., 2006).

Beverly: What you've described sounds to me like one round in a continuous learning process, an ongoing evaluation-change chain.

Aisha: It's helpful to think about the distinctions in this way, but still, these are models. There's a big gap between what a model describes and what we need to do to make a model a reality. For example, as students, we hear about KT a lot. We're taught that it's a necessary part of the research process, and, that for any protocol or project we develop, we should be thinking about KT from the start. We're taught that it's not enough to do research if it doesn't have a life after it's been published. But the practicalities of what KT means, how to do it, and how we would know if we're doing 'it' well – this often isn't clear. I think this kind of training is lacking in many graduate programs.

Identifying KT Competencies

Kelly: Ok, then let's get practical. Is there a core set of KT competencies – knowledge, skills, and attitudes – that urban health researchers can develop? And how can we relate these to transdisciplinarity?

Policy Literacy

Aisha: Most of the urban health researchers and the students I know want their work to influence policy. But that expression, "influence policy" is usually a black box. Many researchers don't really know how policy development unfolds, or how researchers might influence the process. It's not an easy thing to learn, particularly in relation to issues that are cross-sectoral and inter-jurisdictional, and it's rarely taught in graduate school, especially not in the health sciences. So, for starters, I'd say a core knowledge competency for KT is *policy literacy*.

Kelly: At the Centre for Research on Inner City Health in Toronto, we're trying to address this knowledge gap by inviting seasoned bureaucrats and politicians to participate in seminars called, 'How Government Works.' Sometimes I wonder if this exercise isn't discouraging to researchers, because we so frequently hear that policy development is serendipitous, slow, or highly determined by political platforms. Very often, what we hear about is why research is not used, rather than how it is used.

Aisha: Although this exercise can be discouraging, I still think it's a crucial one. For me, attending these seminars has been an eye-opener. It's helped to make

concrete the challenges we are taught about in the abstract in graduate school. It's so important to discover that just because you've found *significant* results (in all senses of the word), it doesn't mean that policy makers will see a need to act, or will be able to act, on your findings. When you're isolated in your research bubble, it's easy to think those things – 'Oh, you should act on my findings right away.' But we need to recognize that stakeholders' priorities are often more complex than researchers', and, not only that, a government's range of motion is quite a bit smaller than I imagined.

Kelly: Big policy changes are slow and rare in coming, particularly the kind of cross-sectoral changes that matter a lot for urban health.

Beverly: Certainly, big changes don't happen often and most of the changes that might come about in the short term can be thought of as 'tinkering around the edges'. The good news is that the edges are amenable to tinkering. Very few of us have the opportunity to do something that changes the world. An incrementalist mind-set about the scope of influence is probably most realistic. Researchers may need to find a way to be satisfied with influencing policy in one locale to improve the lives of 100 people, even though there are 5,000 people in the province and 500,000 in the country who could benefit. This is particularly important when you are working with decentralized organizations, which government ministries generally are. But, perhaps more importantly, what research can more easily do is influence practice. Changing what happens at the front line typically doesn't require a ministerial decision. What it does need is KT that builds knowledge and connects with experience at a deep enough level to motivate behavior change. I'm talking about more than just promoting awareness, more than just hearing about a study from a pamphlet or at a conference. What happens at conferences and presentations? We listen, we appreciate, we take notes, but how many people change what they do once they get back to their workplaces? Adults learn by doing, and when what they're learning really matters to them. Providers are much more likely to integrate their learning and to change their practices in light of the evidence if they've actually been a part of the research. If they've participated, they've experienced and witnessed first hand how the change could happen and why it matters. It's a much more intense experience than the approaches to learning that we traditionally rely on.

Aisha: I think that's why TD projects involving practitioners are so promising in terms of advancing real change. The KT is integrated right into the initiative.

Beverly: It's incredibly important for researchers to develop understanding of how government works, for two reasons. First, if they understand the policy process, then they're going to be more effective at explaining the implications of the research result. This makes the work more valuable to government. But I'd also say, there's a satisfaction factor that makes it valuable for the researcher, too. It's gratifying to see that something you've put a lot of time and effort into is being used, making a difference. When researchers understand the link between their work and the policy process, they are better able to see when their work has made an impact. From a government perspective, this is good because researchers will be more likely to invest time in writing proposals and be more willing to work with us in a collaborative way.

Aisha: This has certainly been my experience. And it holds for working with practitioners and community groups, too. I've learned an enormous amount through working with partners that I wouldn't have learned if our scientific team had produced a report on our own. For example, I've been working on a TD research team that includes inner-city hospital administrators who are responsible for diversity issues. They wanted to gauge how equitably their hospitals were providing services and to see if socially marginalized patients were receiving sub-standard care. They asked us to find out what the research literature said about appropriate indicators to monitor equity in hospital care, which we were enthusiastic to do (Gallaher et al., 2009). An important finding in the literature has been the need to collect patients' socioeconomic status and other personal, socio-demographic information, in order to measure inequities. As we reviewed the literature, we shared our findings with patient representatives and community activists. The community groups expressed real concern about the risks to socially marginalized patients if personal data were collected in hospitals. These are "what-does-it-mean on-the-ground" questions that our scientific team didn't think of at first.

Because we 'workshopped' the research as it was developing, instead of simply 'disseminating' the finished product we were able to discuss these controversial issues in the final report. This has led us into some great new projects. Now we're asking questions about public acceptability of collecting personal data for monitoring health equity that we probably wouldn't have thought about so soon – if at all. We've also had new partners approach us who want to work with us to answer these questions by conducting pilot studies. So we've shifted from asking *what* to measure to asking *how* to measure in a way that's meaningful and acceptable to patients from marginalized groups. The project has taken on a life of its own; the hospitals and the health authority are really encouraging us to keep moving with it. My strictly academic work doesn't get this kind of attention and certainly not within such an immediate time frame. It's a really new experience.

Beverly: Your example, Aisha, points to the networking value that TD teams can bring to KT; because partners are at the table, they put you in touch with other people they know, who could also play a role in implementing the results. It's also a great example of moving from understanding a problem to solving a problem.

Stakeholder Savvy

Kelly: We were talking about general knowledge of government process but what you're saying now makes me think of the importance of being savvy and strategic, too. Being aware of decision-makers' timeframes and a community's priorities is also really crucial. As researchers we need to ask regularly, 'What are the upcoming decision points and events that this research might relate to? How is policy being developed around this issue, and how could this help us frame our study so we focus on what's most relevant to the policy question? When I worked in government,

researchers would approach us to say, 'I've finished this project on community mental health, and since you're responsible for community mental health, I thought you'd want to use it in your planning.' But having a *topic* in common is definitely not enough, because the values underpinning your study, the outcomes you measured, and your recommendations could be completely out of sync with the stakeholder's agenda or the government's broader platform.

Right now, I'm working with health providers who deliver harm reduction services. They want their programs to be evaluated in terms of cost savings. Now, cost savings associated with harm reduction programs have traditionally been measured in terms of reduced rates of HIV infection and treatment. But in these days, in our city, the risk of HIV transmission via needle sharing is low. So we've been asked to think about harm reduction measurement using new outcome measures that are pertinent to the broader policy platform of our health authority. In our case, this means reducing hospital wait times and emergency room (ER) diversion. The agencies asked us, 'Do our programs reduce clients' use of the ER and can we quantify this reduction in terms of cost?' The research trends don't point us in this direction for evaluation. We need the cue about *what matters most* from people working on the ground. It makes our research more challenging to do, more interesting, and ideally more relevant.

Beverly: Your story shows why a TD approach to outcomes measurement is so crucial for responsive KT. Urban health policies are usually nested within a range of broader government programs with many cross-cutting demands. When there are multiple stakeholders, we need to think about outcomes in multiple dimensions.

Asking, Listening, Responding, Explaining

Aisha: What you're talking about now goes beyond knowledge competencies. We're moving into the territory of skills. KT also involves asking stakeholders good questions, listening to their answers, and then revising your focus, if possible, in response to their concerns. Communication skills like these aren't always emphasized in research training, but they're fundamental to both KT and TD work.

Beverly: Don't forget communicating about methods. A great deal of my work involves coaching staff to identify policy knowledge gaps and then to frame the gaps as research questions. It's often not easy for policy staff to do this, partly because it's a new way of thinking about a problem and partly because the policy team doesn't know the research methods inside-out like researchers do, so they don't know what's possible or not possible to ask, given the research tools that are available. I really do think it's a core KT competency for researchers to be able to explain their methods and measures. For TD researchers, this should not be a big stretch – they will have the experience of explaining their methods and their presuppositions to their collaborators from other disciplines.

Kelly: Do we run into a job scope problem here? Do most government staffers really have time or inclination to develop expertise in research methods?

Beverly: This isn't about needing to know how to do someone else's job. I agree that most bureaucrats don't need to become researchers, and researchers don't need

to become bureaucrats in order to do TD work. We do need to value the different expertise that people bring to the table. But bureaucrats' capacity to communicate equitably is diminished when we don't understand research frameworks. I'm talking about equipping decision makers to be knowledgeable participants in the research process and to be informed consumers of research findings. My colleagues need to be able to know what kinds of research approaches are appropriate for answering different types of questions, and, at a high level, what kinds of approaches do or do not lead to valid and reliable findings. Senior decision makers need to have some notion of what constitutes research quality because they have to approve funding for the research and approve the products that are delivered.

We had an economist from your center, Kelly, come in to give us an intensive training on cost effectiveness analysis (CEA): what questions it can and can't answer, what inputs and variables are needed from decision makers, and how to appraise CEA studies critically. He used some research studies as examples, but the objective wasn't to convey the results of those studies, particularly. He was helping us to be better consumers – and commissioners – of CEA research. This kind of work – the capacity to explain your methods and models to experts in other fields – is foundational for TD success, since without it no new methodologies are likely to emerge. It should also be recognized as an important aspect of successful KT.

Writing

Kelly: Ok. So far we've talked about knowledge competencies, including policy literacy, research literacy, and understanding stakeholder priorities. We've also talked about communication skills, including how to ask good questions and respond to stakeholder recommendations. I'm also interested in the fundamental skill of communicating research findings. It's a KT staple, and there's a lot of emphasis in KT about making research writing *accessible*, but the idea of accessibility doesn't get unpacked. I think it's important to talk about this frankly, because there is a tendency – I sometimes hear students say it – to think about 'accessible language' in terms of *dumbing things down*. This is where I sometimes hear frustration from researchers: 'if I simplify this, the meaning will get lost.' And there are also big – justifiable – concerns about 'going beyond the evidence', when you oversimplify or overgenerate. An important question for me is how to approach this problem differently so we're not working with unviable, zero-sum oppositions like 'complex versus simplistic' or 'evidence versus conjecture.'

Beverly: On the government side, we are frustrated by this problem, too. Getting a handle on the concept of *probability* is one of the toughest issues, when research produces findings based on representative samples. The findings are typically framed in probability language that is essential to convey the scientific limits of the findings, but it's often difficult for non-researchers to understand the take-home message. Policy analysts and decision makers tell me they just want a straight answer and that researchers have difficulty with this. Instead, when you oversimplify or overgenerate, they talk about confidence intervals.

There's skill involved in framing a complex or abstract idea in plain language; it's really hard to do. One option is to hire science writers. Who are experienced at converting scientific concepts into plain language. My team took a plain writing workshop not long ago and one of the things we practised was putting sentences in the active rather than passive voice, a fairly straightforward change that increases the readability of a document a great deal. If you look at journal articles with a passive/active filter, you will find that there is a subsantial use of passive sentences. I don't fault the researchers for this because it is a convention of academic language, but, on the user end, it requires an intervention.

One of the things we have recently started to do when we are funding research project proposals is to request a plain language summary report that we can distribute to stakeholders. Your KT team produced a plain language pamphlet for us recently, Kelly, which accompanied a scientific report (Centre for Research on Inner City Health, 2009d). I think that worked really well. We are also adding a clause that requires the researcher to hire a writer if we feel the report is difficult to understand. I can't tell you yet how this is working because we haven't yet acted on this, but that's the path we are on.

Kelly: Another approach that we use is co-writing with our partners. This doesn't have to mean that everybody takes a crack at writing every section, although I have done that, and it's dramatically enhanced the results. We've adopted a strategy from the CIHR Guidelines for Health Research Involving Aboriginal Peoples (Canadian Institutes for Health Research, 2007), which is to agree that partners with dissenting views can write commentaries or caveats that are published with the report. Recently, we organized a TD team to synthesize evidence on concurrent disorder programs for homeless clients (Centre for Research on Inner City Health, 2009c). Some of our partners objected to the intervention terminology used in the published literature because it causes negative reactions in the community. They rewrote those sections using language that would be less controversial for their colleagues. Other partners wrote an addendum because the evidence we'd been able to collect did not address the needs of their priority client groups, which are Aboriginal Peoples and homeless women. Their section articulates the need for more evidence about programs for these populations.

Communicative Intent

Kelly: What I try to convey to my students is that part of what makes research writing inaccessible is not that it is too difficult, per se, but that it is very culturally specific and it contrasts quite a bit with the writing culture in government. A simple way to see cultural differences between researchers and policy makers is to take a look at the differences between a scientific abstract and a briefing note. There are similarities. They are both very short pieces of text, intended to quickly convey the most important elements of a complex issue. Both adhere to standard formats. The abstract usually describes a question explored in a research study, reports on the method used to address the problem, and indicates the quality of the results that

were obtained. Sometimes the abstract includes a summary of the results – but not always. This format reflects what the scientific community values most: high-quality inquiry. In a policy brief, things begin in the same way, with a question or issue. But the briefing note is almost wholly devoted to answering the question and identifying the many implications of the answer. What matters most in the research abstract is how well the question was asked and how well it was answered. In the policy brief, what matters most is 'what was the answer.'

Beverly: Earlier, Aisha, you said we were moving from *knowledge* to *skills*. Now we're at the place where skills flow into *attitudes* – communication attitudes. The issue in KT writing is no different than the fundamental issue in TD collaborations. It's about *communicative intent* –is it really there or not (Albright, Cohen, Mally, Christ, & Bromgard, 2004)? The KT competency here is an attitude toward building, not restricting, understanding. TD teams need to address this head-on by talking about the audience, the communication cultures, and the expectations about what the products look like.

Aisha: What's helpful, I think, about using the concept of cultural differences is that it illuminates how different groups have different meaning systems. It's a TD research issue, too. Since different things matter to different cultural groups, good communication isn't only a matter of simplifying my language so that you can understand me. Just because I understand what you're saying doesn't mean that I will value it in the same way you do. The goal of KT has to be to begin to understand what is meaningful to the research user – and that may be different from what's important to the researcher.

Managing Stakeholder Expectations

Kelly: You talked about learning to frame a policy question, Bev, as a research question and the need to explain our research methods. But it seems to me the challenge goes beyond methods. Researchers and professionals 'in the field' often travel different epistemological routes when they generate questions. Researchers tend to begin by observing a broad or abstract problem and then narrowing down to a very specific question that can be answered with confidence following a scientific method. In our experience, practitioners may take the inverse approach. They encounter a very specific or practical problem, and, in the course of framing research questions, their inquiry broadens and they see a whole family of interconnected issues that impinge on the question that also need to be addressed. In both cases, the process of defining the problem and the question are learning exercises. But the processes seem to move in opposite directions, and it can be challenging to execute a delimited project that makes sense and is meaningful to everyone.

Earlier I mentioned a TD study we conducted with service agencies related to concurrent disorders treatment. The KT objective and the research objective were closely linked: the goal was to produce a high-quality evidence synthesis that could be used in negotiations to integrate mental health and addictions policies (Centre for Research on Inner City Health, 2009c). It seemed the more we

prompted our partners to isolate and hone the research question, the more they identified policy nuances, complexities, contradictions, and systemic links that needed to be taken into account for the study to be comprehensive. We had a big scope challenge on our hands, which we would not have encountered if we were doing this on our own, without experts who knew mental health and addictions policy inside-out.

Beverly: Of course. That's what you would expect of experts in a field. That's the challenge of an integrated approach; it helps to identify questions and complexities, but then you have to figure out the best way of dealing with them. In the work we do, we try to start with policy or program objectives and then make sure that the research questions line up with these. Then, if the scope of the research becomes too big, we prioritize the objectives. This approach seems to work pretty well but, then again, we are not working at a clinical level where you have to control for many variables.

Adopting Responsive, 'Realist' Methodologies

Kelly: Working with urban health stakeholders has led the scientists at our center to take that problem – controlling for variables – really seriously. The highest quality experimental research approaches in the health sciences – randomized controlled trials (RCT) – are designed to test the outcome of a narrowly defined clinical intervention, like the physiological effect of a drug. Perhaps the most important quality indicator in an RCT is how well the study controls for the influence of contextual factors on patient outcomes. For example, we use a placebo to control for the effects of provider attitudes or patient expectations about the efficacy of the intervention. But that approach doesn't make a lot of sense if we're testing interventions like broad population health policies or programs targeting complex populations who are affected by a mix of social and health conditions. These kinds of complex interventions work in part *because* of the participation of the people involved. They're also affected by the social and economic conditions in which the interventions are delivered, and there's often a feedback loop that affects the program over the longer term. Even in a study context, the interventions aren't delivered in a vacuum, so knowledge of how they might work outside of a real-world context is irrelevant to our partners, and it could also be misleading. Context effects matter here, and it's critical to take them into account, versus trying to control or eliminate them.

KT proponents have spent a lot of time exploring how to work in effective partnership with stakeholders and how to express research finding that are accessible and relevant. But there are limits to how productive these efforts can be if our research tools are simply inadequate to stakeholders' questions. Adopting new methods to respond to stakeholders' evidence needs is another facet of integrated KT, although we talk about this less often.

Aisha: I think this is why we're seeing movement now, especially in TD teams, to generate more appropriate methods for evaluating complex population health interventions (Hawe & Potvin, 2009). For example, we're looking at how to use

realist paradigms for interventions research (Pawson & Tilley, 1997). This means to take seriously questions like *why* do interventions work (and why they don't), *how* they work, and under what circumstances they work. Traditional RCT studies don't answer these kinds of questions that are important for KT.

Advocacy and Forming Coalitions

Kelly: There's an elephant in the room I'd like us to talk about. And that's the relationship between KT and advocacy. Ever since Max Weber delineated the 'proper' role of science as being distinct from politics, we've cultivated the idea that science can't maintain its objectivity if it gets involved in advocating for policy change (Weber, 1946) – science should be neutral and objective. It's about facts, not opinions. And essentially it's about describing *what happened* in an experiment not what *should* happen in a real world setting. But this sharp delineation between facts and opinions seems to be a problem when we are encouraged to do KT about social or political research and evidence. Many decision makers who want to hear from scientists also want scientists to make recommendations about 'what to do.'

Beverly: In my experience, this is an individual preference. Some decision makers want researchers to make recommendations but others don't. Those who do tend to believe that researchers are in a good position to make recommendations because they understand the topic so well. Others feel that the researcher's job is to provide evidence, but that it is the job of the policy analyst to consider the evidence, to develop options that take the evidence into account, and then make recommendations that recognize the opportunities and limitations that exist. It is also a matter of individual preference on the part of the researcher: some do want to make recommendations and others don't, and I have dealt with both kinds. My own observation is that there are researchers who have the skills and experience to develop balanced recommendations that demonstrate an understanding of the political and fiscal context, and there are researchers who don't.

I also feel that what integrated KT should lead to is an increase in what we refer to as policy capacity, I'm talking about the capacity to deal with numbers, graphs and charts, and the capacity to understand basic research concepts. This should put policy analysts in a stronger position to develop good, evidence-based options, to make reasoned recommendations, and to clearly articulate the implications of implementing the recommendations.

Kelly: Fair enough, but I still feel there's a conservatism in standard KT discourses that isn't necessarily helpful in guiding researchers who do work related to stigmatized health problems and populations, like we do. Central to most of the KT literature is the tacit assumption that research producers and users can come to a shared definition of the policy problem and that research can help decision makers solve this problem (Chalmers, 2005; Estabrooks, Thompson, Lovely, & Hofmeyer, 2006). But defining inner-city health problems is usually contested, political, and value laden (Bayoumi, Hwang, & Silversides, 2003). Take substance use, for example. It's a complex problem that can be framed using a range of lenses –

medical, criminality, economic marginalization, ethics/morality, and social justice – and researchers and decision makers may hold widely divergent views. Indeed, one goal of the research may be to contribute to redefining the dominant interpretation, and the KT goal may be to educate policy makers to understand the issue in a new light. This is what's called the *enlightenment* model of 'KT' (Weiss, 1979). But more often, it seems to me, we call it 'KT' when the effort is about not rocking the boat, enabling decision makers to follow their course, but it's called 'advocacy' when our key message is about change. This can be an awkward role for researchers to take on, and there's concern that it can undermine their credibility.

Aisha: Working in TD teams with agencies that have defined advocacy mandates – or that, at the very least, don't shy away from advocacy – can be very productive in this respect. In the hospital equity project I mentioned earlier, our partners are arguing the case for measuring health equity in hospitals; it's a grassroots initiative and we're not leading it. Our role has been to equip them with evidence. The partners identified the need for the report and helped us to understand what issues to focus on. We reviewed and appraised the literature using our various disciplinary perspectives, and we wrote the report, incorporating the partners' ongoing feedback. To use this report strengthens their case because it's been produced by an accredited, academic institution and it bears our stamp of quality.

Kelly: Political scientists call this the *advocacy coalition* model of influencing policy change (Fafard, 2008; Sabatier & Jenkins-Smith, 1999). It's about getting 'all hands on deck,' with each group contributing what it knows and does best to mobilize support for social change.

Beverly: It's also implicitly TD because diverse expertise is brought to bear to address the problem.

Engaged Scholarship

Kelly: Bev, you said at the beginning that you preferred thinking about 'integrated research' rather than, 'integrated KT,' and that makes sense to me. I'm a knowledge broker, but I'm often ambivalent about emphasizing the need for this role. I wonder how much we re-inscribe the 'two solitudes' of research versus non-research when we emphasize KT as a very distinctive set of practices. A lot of what we've talked about today is not about "doing KT" in contradistinction to "doing research." We've been talking about doing the research itself differently, using a TD framework that encompasses stakeholder engagement, knowledge sharing, and problem solving. Outside the university, R&D is regularly undertaken in this way – sociologists call it *Mode 2 Knowledge Production* (Denis, Lehoux, & Champagne, 2004; Gibbons, Limoges, & Nowotny, 1994). Yet there's a real reluctance to shift academic institutions toward engagement and away from the conventional markers of research quality and achievement, so we talk about KT as a separate set of activities separate from science.

If the change happens in the academy, I think it will start with the next generation of researchers. In other spheres, 'Gen Xers' and 'Gen Yers' are blurring

conventional boundaries for sharing knowledge, they're pursuing new avenues for activism and community engagement, and they're impatient with conventional career models. This is encouraging to me as a knowledge broker. I think there's appetite among new graduates to pursue research careers that are more organically connected to communities and to the social issues we're confronting in the twenty-first century. The Big Ten universities and some major research foundations have done a lot of work around this notion recently, with the aim of reconfiguring graduate education around *engaged scholarship* (Committee on Institutional Cooperation, 2005; Weisbuch, 2005). These groups don't talk about KT, but they do talk about the importance of TD programs as key contexts for promoting engaged scholarship.

Aisha: I'm a fellow in a TD graduate program that takes an *engagement* approach. The trainees come from different scientific disciplines and we're learning to work together across our various home disciplines.

Building TD, KT Competencies: An Example

Kelly: Aisha is talking about our graduate KT practicum in urban health. It's hard to provide training in KT competencies (or *engaged scholarship*), for a number of reasons. The most obvious challenge is that doing research in KT partnership with community and policy agencies, and acting outside the academy to support research uptake is time intensive. It can significantly extend the completion time of a research project – often longer than the PhD training period can accommodate. It's also the case that, for KT partnerships to be of real value to community and policy partners, the researcher must bring some solid resources to the table, like substantial prior experience as an investigator, expert methodological and substantive knowledge, and the autonomy to share ownership of intellectual property if that's appropriate. Typically, trainees are just developing these resources, so the partnership may be unbalanced.

A few years ago, with these challenges very much in mind, we set up a training container for fellows to do 'integrated KT' with partners. One of our post-doctoral fellows called it 'a crash course in the wild world of KT.' There are two faculty coaches – one to provide methodological expertise and one to provide guidance on KT and to manage the administrative chaos. The trainees are the lead research partners. To keep the scope manageable, we usually recommend a project involving secondary data, like a realist systematic review. We leave the project topic to the discretion of the stakeholder partners.

Aisha: Our team started by developing a terms of reference document, to describe everybody's roles, time frames, and deliverables. We spent quite a bit of time working out authorship and intellectual property ownership issues and preparing the ethics review document, which is always a little more complicated since community groups are involved. The team used agreement templates and other resources for community-based participatory research that are available through the Campus–Community Partnerships for Health Network (2009), and we amended the documents to emphasize the training component and our educational needs as trainees.

Kelly: In Aisha's project, the trainees worked with their partners to map out an approach to measurement of health equity in hospitals. They met monthly (sometimes more often) to get the partners' perspectives on the progress of the work and to make adjustments so the research captured the right issues, from the partners' points of view.

Aisha: Those meetings were invaluable in helping us to create a final product that was responsive to our partners' needs. For example, it wasn't enough to use only the scholarly criteria of validity and reliability when assessing the quality of health equity indicators. We also had to assess whether the indicators were feasible for our partners to use in their hospitals and if they would be applicable to the patients they commonly see in their home contexts. We couldn't just ask, 'Does the literature say this is a good indicator of equity?' We also had to ask, 'Does the indicator matter to our partners? Does it describe services that are actually delivered in our local hospitals? And is it possible for our partners to collect the data?' Our partners also had certain groups that they had designated as *priority populations* of interest, so we made sure that care for these groups received special focus in the report. Without those meetings and without our partners' input, we would probably have produced a report that was less relevant or useful.

Kelly: We worked a lot on writing so that the final report was pithy enough and jargon free, while remaining true to the data. And, throughout, as Aisha said before, the fellows presented drafts to clinicians, hospital CEOs, government staff, activists, community agencies, patients, and IT professionals. This kind of intense and diverse interaction with stakeholders is a rare experience for most scientists, let alone trainees. Now they've become very adept at talking about the issues and the implications of the research and they're called upon to participate at various planning tables. A consortium of hospitals has started to work with the trainees to pilot their recommendations, and the ministry has asked them to take on some related projects. So, this is a KT project that I'd say has had a lot of impact in a short amount of time. Two things have struck me about this experience. First, these young researchers quickly became part of a diverse stakeholder community that is taking action around health equity in our city. They've really moved into the knowledge-action cycle (Graham et al., 2006) that we talked about earlier. The second point, though, is that they're not particularly self-conscious about the fact that they're "doing KT." We never really discussed KT models or frameworks – we just launched into the work. Later, when we proposed writing up the KT aspects of this project, someone even asked, 'Well, which part *was* KT?' This really drove home for me the point that new researchers don't necessarily make a distinction between TD and KT. This is a distinction they're trained to make in more conventional research programs**.**

Aisha: Still we need to be able to articulate on *CV*s and in job interviews when we've done this kind of work and why it's valuable. It's often easier to describe our TD experience, but it's important to be able to articulate the rationale for, and outcomes of, our KT work. That's why I really like what we've done here: describing

KT and TD in terms of core competencies. We've created a list that researchers can look at and say, 'Hey, that's what we did! It matters'.

Conclusion

Kelly: We've come to the end of our time and we've covered a lot of ground, so thank you both for this discussion. We've developed a list of core KT and TD competencies for researchers (see Table 9.1).

Table 9. 1 KT/TD competencies

KT/TD competency	Category (knowledge, skills, and attitudes)
Policy literacy	Knowledge
Stakeholder savvy	Knowledge/skills
Effective verbal communication with stakeholders (asking, listening, responding, and explaining)	Skills/attitudes
Effective writing for non-academics	Skills/attitudes
Stakeholder management/project management	Skills/attitudes
Communicative intent	Attitudes
Adopting responsive, 'realist' methodologies	Knowledge, skills, and attitudes
Advocacy, coalition forming	Knowledge, skills, and attitudes
Engaged scholarship	Knowledge, skills, and attitudes

And through all this we've seen that KT work shares a deep affinity with TD research. At the beginning, Aisha, you said that many TD projects are construed as research projects, not KT projects. When that happens, I think TD teams are shortchanging their own radical potential, perhaps not even being fully true to TD principles.

Aisha: Yes. I've come to think that KT is a natural extension of TD practice. They're both about making the learning-action continuum come to life, as you spoke about, Bev. And the KT competencies we've identified, these are the same competencies required for successful TD research: knowledge of the other, capacity to communicate with the other, and readiness to be flexible, expressive, and to work collaboratively.

Beverly: These are competencies needed by all the partners at the table, including those representing the policy community. They point a way forward for all of us.

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Part IV
Moving Forward

Chapter 10
Transdisciplinary Training in Health Research: Distinctive Features and Future Directions

Shalini Misra, Daniel Stokols, Kara Hall, and Annie Feng

The malaria and AIDS epidemics, rising cancer, diabetes, and obesity rates are but some of the tremendously complex global health challenges of the twenty-first century. Since these challenges do not lie in the domain of any one academic discipline, many scholars have recognized that if they are to be tackled effectively, a new generation of scientists and health promotion practitioners must be trained to ensure that they have the requisite conceptual, methodological, and interpersonal skills to enable them to bridge traditional discipline-based, regional, and cultural boundaries (Nash, 2008; Nash et al., 2003; National Academy of Sciences, 2003; von Ruschkowski, 2003). In recent years, several transdisciplinary (TD) training programs have been initiated at undergraduate, doctoral, and post-doctoral levels with the aim of producing scholars capable of integrating and transcending theoretical and methodological boundaries of disciplines in a variety of problem areas (Fuqua, Stokols, Gress, Phillips, & Harvey, 2004; Nash, 2008; Nash et al., 2003; Stokols et al., 2003; Stokols, Hall, Taylor, & Moser, 2008). For example, in 2002–2003, the Canadian Institutes for Health Research funded 85 5-year nationwide TD training programs from undergraduate to post-doctoral level, entitled the Strategic Training Initiative in Health Research (STIHR). The foci of the programs spanned a wide range of areas including partnering in community health research, inner-city health, tobacco research and control, addictions and mental health policy services, cancer research and technology transfer, and molecular oncologic pathology just to name a few.

Whereas the educational and societal benefits of TD training have been heralded by many scholars, little empirical research is available on the short- and longer-term outcomes of TD as compared to unidisciplinary training (Lattuca, 2001; Nash et al., 2003; Younglove-Webb, Gray, Abdalla, & Purvis Thurow, 1999). There is little consensus about what constitutes TD training and on which dimensions it differs from unidisciplinary (UD), multidisciplinary (MD), and interdisciplinary (ID) approaches to education. How might effective TD training programs be designed and implemented at various educational levels (e.g., within undergraduate, graduate,

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and/or post-doctoral programs)? What challenges and opportunities are associated with TD training? What criteria should be used to evaluate the processes and outcomes of TD training? The ensuing discussion provides an overview of the state of knowledge pertinent to these questions. Specifically, we focus on: (1) the distinguishing features and goals of TD training as compared to UD, MD, and ID training models; (2) distinctive characteristics of TD training models and programs at the undergraduate, doctoral, and post-doctoral levels; (3) new methods and metrics developed for evaluating TD training; (4) challenges encountered by TD programs as compared to discipline-specific ones; and (5) emerging issues for future investigation that pertain to the most effective strategies for designing, implementing, and evaluating TD training programs.

TD Training: Distinguishing Features and Goals

Nash (2008) conceptualizes different approaches to crossdisciplinary (CD) training in terms of the degree to which they synthesize conceptual and methodological perspectives spanning multiple academic disciplines (e.g., genomics, psychology, and political science) and levels of analysis (e.g., biological, individual, societal). Accordingly, UD training promotes the least amount of integration across boundaries of disciplines and analytical levels whereas TD training encourages the greatest degree of integration. Nash suggests that MD training programs tend to be primarily discipline specific but many of them also include components that encourage students to work with researchers from multiple fields. ID training models aim to prepare students to have functional knowledge of the conceptual frameworks and methodologies of several disciplines. TD training programs are distinctive, relative to UD, MD, and ID approaches, in that they embrace the explicit goal of training scholars who are able to integrate and transcend 'disciplinary'[1] boundaries and multiple levels of analysis within a given problem area.

TD training, ideally, incorporates not only a substantive scientific focus bridging two or more fields, but also a *value-added, process-oriented component* that introduces participants to the unique qualities and requirements of CD collaboration. For instance, trainers and trainees can be educated about the powerful contextual forces that may alter the pace, quality, and impact of collaborative outcomes,[2] the subtle but tangible links between social and intellectual integration that are evident within several arenas of TD collaboration, and the availability of practical strategies (e.g., regular retreats and brainstorming sessions) that can be used to enhance the success of TD research and training initiatives.

[1]The term 'disciplinary' in the context of this chapter refers to 'academic disciplines.'

[2]Collaborative outcomes of TD training programs include *process oriented outcomes* such as changes in intellectual values and interdisciplinary attitudes and behaviors as well as *product-oriented outcomes* such as the transdisciplinary scope and qualities for research papers, grant proposals, theses, and dissertations. Longer-term outcomes of TD training programs include the transdisciplinary orientation of trainees' future career plans and goals (Misra et al., 2009).

Moreover, TD training can combine mentorship provided by scholars based in academic disciplinary departments and interdisciplinary university centers with the mentorship provided by community professionals who interact with trainees in non-university field settings. Such TD training programs expose trainees not only to interdisciplinary (academic) collaborations but also to "inter-professional" (and often non-academic) partnerships, as is the case with cross-sector action research (Stokols, 2006) and experiential learning programs that bring together university scholars and community professionals and decision-makers.

TD training strategies can be applied within several arenas of scientific collaboration and at multiple levels of TD training within each arena. For instance, three major arenas of TD research and training are: (1) *intra-center collaborations*, especially the TD research and training processes experienced by the members of a particular research center; (2) *multi-center collaborations* emphasizing the sharing of scientific information and training strategies among the members of two or more research centers; and (3) *research center-community collaborations* involving the TD exchange of information among scientists, community leaders, and policy-makers. Similarly, collaborative processes can be viewed at both intra- and inter-institutional levels–that is, as they occur within the context of a particular institution (e.g., a university, research agency, or foundation, each of which includes multiple research centers) or, alternatively, as they connect and integrate the activities of multiple institutions and their respective members.

Within each arena of collaboration several levels of TD training can be identified. This includes researchers' collaborative exchanges of information: (a) among themselves (i.e., among fellow senior scientists), as well as with (b) *pre-doctoral trainees*, (c) *postdoctoral trainees and new investigators*; and (d) *community leaders and decision-makers.* The levels of TD training emphasized within each arena of collaboration vary according to the composition and programmatic goals of the collaborative enterprise. Thus, some collaborations might incorporate all four training levels whereas others (e.g., the research center-community arena of collaboration) might include only a subset of those levels (e.g., some inter-investigator and scientist-policy maker collaborations may not include pre-doctoral or post-doctoral trainees).

TD training programs aim to nurture a number of *scientific*, *intrapersonal*, and *interpersonal* qualities in their trainees. In addition to the goals of UD training programs (e.g., instilling in trainees strong conceptual and methodological competencies), there are several *scientific* goals that are unique to TD training. One such goal is to foster trainees' capacity to extend and integrate scientific findings, theories, and methods from multiple fields. Additional aims of TD training are to enable trainees to work closely with community-based practitioners and stakeholders (Bammer, 2008), develop novel practice-oriented theoretical and methodological frameworks drawing on the perspectives of multiple fields, and translate scientific knowledge into evidence-based policies, community interventions, and clinical practices. Ideally, the scientific competencies of TD scholars and practitioners should be supplemented by effective interpersonal communication, leadership,

and administrative skills, all of which are essential for achieving and sustaining collaborative success among scientists and their community partners.

Whereas ID training programs encourage trainees to become conversant with different disciplinary perspectives and acquire the ability to coordinate with community groups and health practitioners, they do not necessarily teach them how to integrate the perspectives of multiple fields as TD training programs do (Nash et al., 2003; Stokols et al., 2003). Thus, another goal of TD training is to enable trainees to bridge disciplines along *horizontal* or *vertical* dimensions and across a *narrow* or *broad* range of fields (Stokols et al., 2003). *Horizontal integration* occurs when trainees bridge different disciplines at the same level of analysis (i.e., the societal level of analysis is shared by political science, sociology, and anthropology; whereas the biological level of analysis is common to fields such as biochemistry, pharmacology, and virology). *Vertical integration*, on the other hand, occurs when the disciplinary perspectives bridged are at different analytical levels (i.e., linking sociological, psychological, and genetic analyses of disease susceptibility). *Narrow range* TD training encompasses fields whose disciplinary perspectives are relatively similar and thereby ostensibly more easily combined (i.e., molecular biology and neuroscience). *Broad range* TD training encompasses disciplines whose perspectives may be more difficult to integrate because their conceptual and methodological assumptions are divergent (i.e., integrating the qualitative ethnographic methods of medical sociology with the quantitative assays used in genetics and pharmacology research) (Stokols et al., 2003).

As noted earlier, TD training aims to foster certain intrapersonal and interpersonal skills as well as scientific competencies. At the *intrapersonal level*, it is important to cultivate a "TD Ethic" (Bradbeer, 1999; Stokols, 1998), which broadly construed encompasses: (1) the cognitive flexibility to move between various levels of analysis, scientific worldviews, and methodological perspectives; (2) inclusive rather than exclusionary ways of thinking; (3) broad-gauged contextually oriented theorizing as opposed to circumscribed reductionist thinking; (4) the ability to develop creative solutions to intractable real-world problems; (5) open-mindedness, tolerance, and respect toward diverse disciplinary perspectives and scientific worldviews; (6) egalitarian values and a culture of sharing; (7) an appreciation of and interest in collaborative work; (8) optimism about the scientific and societal outcomes of collaboration; (9) the perseverance, determination, and stamina to overcome and learn from situations of conflict and dissent inherent in TD work; and (10) the ability to adapt to changing circumstances, remain open to new perspectives, and challenge existing assumptions and practices.

At the *interpersonal level,* TD training should strengthen individuals' capacity to work effectively in teams. Toward that goal, certain competencies should be fostered including: (1) excellent communication skills that build and sustain cooperation among team members representing diverse disciplines and educational backgrounds; (2) the ability to manage and resolve interpersonal conflict; and (3) the ability to reach consensus around shared visions and goals and to reduce task-related uncertainties.

Effective TD training requires a sustained mutual exchange of information among trainers and trainees over the course of successive interactions, rather than a one-way episodic delivery of information by experts to non-experts. As such, the roles of trainer and trainee can change in the context of collaborative TD training, such that the trainer may be the trainee in the context of another domain at a different moment in time. Furthermore, TD scientific collaboration and training depend greatly on the establishment of shared terminology and common conceptual ground among participants who have been trained in different fields and are essentially "non-experts" outside of their specialty areas. The cultivation of common linguistic and conceptual understandings requires a greater degree of reciprocal information exchange and receptivity to unfamiliar approaches in TD, as compared to non-TD training arenas.

How can such skills and competencies be cultivated in trainees? What is the relative importance of each of these goals (scientific, intrapersonal, and interpersonal) at the various levels of TD training (e.g., undergraduate, doctoral, and post-doctoral levels)? What specific curricular components most effectively foster the requisite skills and competencies? The following section offers examples of various kinds of "formal" TD training programs and describes exemplars of those (at undergraduate, doctoral, and post-doctoral levels) in terms of their core curricular components.

TD Training Programs: Undergraduate, Graduate, and Post-doctoral Levels

Growing interest in ID training and education has led to the development of a number of undergraduate and graduate programs. Examples in the United States include the University of Southern California's Institute for Health Promotion and Disease Prevention Research, which provides mentorship to undergraduates in the area of health promotion and disease prevention (see http://ipr1.hsc.usc.edu/ipr/). At other universities such as UCLA and the Universities of Michigan, Oregon, Texas at Austin, and Wisconsin, undergraduate students are trained in MD topics such as biotechnology and society and environmental studies. Similarly, CD approaches to the study of health and illness such as the "biopsychosocial" model, cognitive neurosciences, and psychoneuroimmunology have been incorporated into undergraduate curricula at a number of universities. On the other hand, formal TD training programs are a relatively new endeavor and still few in number.

Based on Nash et al.'s (2003) conceptualization of CD training programs, TD training programs should incorporate certain key components regardless of the educational level at which they are conducted: (1) the teaching of ID courses using a team of instructors (multi-mentor model) or a single instructor trained in ID concepts and methods (single mentor model); (2) the establishment of forums for the frequent exchange of scholarly ideas between faculty and students; and (3) promotion of an institutional climate of openness, respect, and trust that encourages the examination of new ideas and experimentation with novel research methodologies. Some examples of TD training programs in North America include the CIHR

Strategic Training Initiative in Health Research (STIHR), the NIH Transdisciplinary Tobacco Use Research Centers (TTURCs), the Robert Wood Johnson Health and Society Scholars Program, the NCI Cancer Prevention Fellowship Program, the School of Social Ecology at the University of California, Irvine (UCI), and the NIH Interdisciplinary Summer Undergraduate Research Program (ID-SURE) at the University of California, Irvine (ID-SURE, 2004; National Cancer Institute, 2008; Robert Wood Johnson Foundation, 2008; UC Irvine, 2008). We discuss the curricular strategies of some of these training programs below.

TD Training at the Undergraduate Level: The Case of ID-SURE

UCI's ID-SURE program is one the few TD training programs developed to train undergraduate students in the field of health promotion and disease prevention (ID-SURE, 2004). The ID-SURE curricular strategy was guided by Nash et al.'s (2003) conceptualization of TD training outlined above. Specifically, (1) teaching was performed by a team of faculty representing a variety of disciplines such as health psychology, environmental health sciences and policy, psychiatry and human behavior, and cell and molecular biology, and medicine; (2) the training program instituted regular meetings providing a time and place for idea exchange among faculty and students in addition to weekly lectures; and (3) the program was jointly administered by the School of Social Ecology at UCI whose academic mission is to analyze research and community problems from a broad ecological perspective and encourage faculty and students to integrate disciplinary perspectives in their research, in collaboration with UCI's Undergraduate Research Opportunities Program, noted for encouraging undergraduate research (see http://www.urop.uci.edu/).

Undergraduates participated in a 10-week course titled "The Social Ecology of Health Promotion and Disease Prevention" and a 10-week summer research internship program that provided them training in integrative concepts, theories, and methods; exposure to diverse disciplines; opportunities to apply TD theoretical models and techniques to the analyses of community health problems and to collaborate with students in disciplines other than their own; and mentorship from faculty representing different disciplines. During the 10-week summer research internship period, students had the opportunity to work on laboratory or field research projects related to the broad field of health promotion and disease prevention under the guidance and supervision of a faculty mentor. Faculty mentors in the ID-SURE training program represented the Biological Sciences (e.g., biomedical engineering, pharmacology) and the Social Sciences (e.g., psychology, anthropology) (Misra et al., 2009).

TD Training at the Doctoral Level: The School of Social Ecology at UC Irvine

UCI's School of Social Ecology and its predecessor, the Program in Social Ecology, was established in 1970 with the mission to train students to research and analyze

policy questions from a broad ecological perspective that integrates multiple disciplines and links basic theory and research to community problem-solving. The social ecological approach is concerned broadly with the study of relationships between people and their socio-physical, cultural, and political environments and adopts the following tenets: (1) CD, multi-level analyses of social phenomena; (2) employing systems theory principles (e.g., negative feedback loops, interdependence of system elements, anticipating the unintended side-effects of interventions) in the analysis of social problems; (3) an emphasis on contextual influences on people-environment relationships; and (4) the translation of theory and research findings into community interventions and public policies.

The School currently offers doctoral degrees in three MD fields–Planning, Policy, and Design; Psychology and Social Behavior; and Criminology, Law, and Society – as well as Ph.D. degrees in Social Ecology and in Social Ecology with an emphasis on Environmental Analysis and Design. The various Ph.D. programs offered include a required core seminar that introduces doctoral students to the social ecological framework for CD research and community problem-solving (see https://eee.uci.edu/08f/51000/). The course readings and lectures guide students through the history of the ecological paradigm, the conceptual and methodological principles of social ecology and systems theory, and the challenges raised by efforts to translate scientific knowledge into evidence-based community interventions and public policies. Also, examples of social ecological theories, research projects, and community interventions are examined from the perspectives of Social Ecology's diverse academic departments and research centers.

Another core curriculum component in the Ph.D. training program is a seminar course on Strategies of Theory Development in which students are trained to develop their own theoretical ideas. Specifically, Ph.D. students: (1) create social ecological models relevant to their particular research interests that highlight the interplay between psychological, socio-cultural, and environmental factors; (2) learn about the challenges that arise when attempting to develop theories that bridge multiple disciplines and levels of analysis; and (3) learn to consider alternative scientific worldviews and contrasting metatheoretical perspectives on the nature and uses of theory.

TD Training at the Post-doctoral Level

Whereas TD training at the undergraduate or early graduate levels emphasize a didactic approach, mentoring and apprenticeship are more crucial at the advanced graduate and post-doctoral educational levels (Nash, 2008). According to Nash (2008), two TD training models are employed at the post-doctoral level: *the single mentor apprenticeship model* and *the multi-mentor apprenticeship model.*

The single mentor apprenticeship model: In this approach, the trainee receives mentorship, guidance, and training in TD methods and concepts from a single TD researcher. The single mentor apprenticeship approach, however, is not common because very few researchers have sufficient knowledge and experience in TD concepts and methods to be able to provide comprehensive CD training (Chang,

Hursting, Perkins, Dores, & Weed, 2005; Nash, 2008). As the culture of research changes and more researchers are trained and become proficient in TD research, a single mentorship approach may become a more viable or common approach, especially at smaller institutions where multi-mentorship models may be difficult to implement due to the intensity of personal resources required. Ultimately, although TD trainees may begin their research under the guidance of a single mentor based on compatible scientific interests and working styles, they often require the guidance and expertise of investigators in other fields and institutions to further their own research interests as they progress through the training program.

The multi-mentor apprenticeship model: In this approach, a team of mentors representing diverse academic disciplines or departmental and institutional affiliations guide the TD trainee on a particular research topic by combining their individual disciplinary perspectives. Through such mentorship and guidance, the trainee learns to develop a broad-gauged TD approach to his or her own research topic.

The NCI's Cancer Prevention Fellowship Program provides an example of the multi-mentor apprenticeship approach (Chang et al., 2005; National Cancer Institute, 2008). The goal of the fellowship program is to provide post-doctoral trainees a thorough grounding in the field of cancer prevention. This program includes didactic components such as a formal 1-year training program in the ID field of Public Health, followed by 2 years of mentored research in one or more substantive areas (e.g., laboratory-based cancer prevention research, epidemiologic research, behavioral science research, prevention-related policy research, qualitative and quantitative research methodologies). The post-doctoral fellows also participate in structured professional development training activities aimed at fostering leadership skills and TD scientific perspectives.

Other examples of the multi-mentor training model are found within the TTURC initiative at the Brown University Medical School and at UCI (Fuqua et al., 2004; Nash et al., 2003; Stokols et al., 2003; Stokols, Harvey, Gress, Fuqua, & Phillips, 2005). Post-doctoral fellows funded by the TTURC program at Brown University conduct research on tobacco-related cancer prevention and control. In order for fellows to be competent in TD theory and research techniques, research ethics, and grant and manuscript writing related to tobacco research, an individualized training program was developed including didactic elements (e.g., workshops on research methods, behavioral medicine, ethics, and transdisciplinarity), mentorship (e.g., from scholars representing disciplines other than their own who work on tobacco-related topics), and collaborative and independent research opportunities (e.g., writing review papers, conducting small-scale pilot studies, writing and submitting grant proposals). Similarly, at the UCI TTURC, bi-monthly forums were organized to provide post-doctoral fellows and junior faculty opportunities to discuss important papers in the field, share their own recent research, and discuss future scientific directions and disease prevention strategies. The fellows also participated in working groups (e.g., Public Health work group) and a seminar series on the latest tobacco-related research. The forums, workgroups, and seminars were intended to foster fellows' integrative conceptual and methodological skills and also familiarize them with the latest tobacco use research in different fields.

A fundamental assumption underlying the programs and models described above is that TD training will result in superior scientific outcomes and community interventions compared to UD training. However, at the present time, relatively little is known about the effectiveness of large-scale TD training programs and their intellectual and societal value compared to smaller-scale, UD research and training initiatives. Whereas a number of conceptual frameworks have been proposed to evaluate antecedent conditions, intervening processes, and outcomes of TD science initiatives (e.g., Fuqua et al., 2004; Stokols et al., 2003, 2008), very few empirical studies have evaluated the outcomes of TD training programs. The following section discusses the latest developments in the evaluation of TD training programs, including explicit criteria for operationalizing TD training processes and outcomes.

Evaluation of TD Training Programs

Mitrany and Stokols (2005) developed two methodological strategies to evaluate the TD *processes* and *outcomes* of the doctoral training program in Social Ecology at UCI, one of the TD training programs discussed in the previous section. *Process measures* include self-reports of the influence of coursework, research mentorship, and scholarly exchanges as well as self-appraisals of TD values, attitudes, and behaviors. *Product measures* include external, objective assessments of the TD qualities of trainees' published papers, theses, and dissertations. They developed composite scales for assessing the TD scope of doctoral dissertations that can be applied to a wide range of training and research programs. Misra et al. (2009) adapted the Mitrany and Stokols' (2005) measures to develop criteria for evaluating the intellectual processes and products of an undergraduate TD training program (ID-SURE).

In their analyses of the TD training processes and outcomes of the ID-SURE program, Misra et al. (2009) found that the curricular components of the program were effective in training students in TD concepts, methods, and skills. Specifically, the program increased students' TD orientations (e.g., the extent to which they value TD work; are optimistic about the scientific outcomes of such work; are tolerant and open-minded toward research perspectives other than their own; and use multiple research methods from many disciplines) as well as their collaborative behaviors (e.g., reading journals, taking courses, and attending lectures and talks outside of their primary academic major) over the course of the training program. As well, the TD orientation of the students' mentors (e.g., the degree to which they value and engage in TD collaborative work) was found to moderate the influence of the ID-SURE training program on the integrative quality of the students' term projects.

Mitrany and Stokols (2005) also found in their analyses of the outcomes of doctoral training in Social Ecology at UCI that the TD quality of students' dissertations was strongly influenced by the students' advisors and departmental affiliations. Dissertations written under the supervision of advisors from smaller, more MD, and less traditional departments had higher ratings on the dimensions of TD scope (e.g., degree of TD integration, number of fields brought together,

number of analytic levels bridged, diversity of research methods used, and contextual breadth of students' conceptual approach to the topic). They posit that these results may have occurred because collaborative research based on shared interests rather than affiliation to a certain academic discipline is more readily achieved in smaller departments where there is a more supportive climate for cooperation among scholars representing diverse fields.

Mitrany and Stokols also found that the doctoral training program at UCI has been moderately successful in instilling a CD research orientation in its graduates. Whereas few dissertations demonstrated TD qualities such as the development of novel conceptual frameworks that integrate and transcend disciplinary boundaries (see Rosenfield's (1992) criterion for the most robust form of TD science), a sizable proportion of the dissertations analyzed by independent reviewers revealed strong ID qualities (e.g., linkages between concepts and methods of two or more fields and broad contextual scope of the conceptualization of the topic). While Mitrany and Stokols' research provides evidence for some of the short-term outcomes of TD training programs, the longer-term effects of TD training such as the extent of the TD orientation of trainees' future goals and career trajectories as well as their achievements as TD scholars (Misra et al., 2009) warrant explicit investigation in future studies.

To this point in the chapter, we have examined certain components of TD training, some of its potential short-term benefits, and strategies for evaluating the processes and outcomes of CD education and mentorship. TD training programs, especially at the advanced graduate and post-graduate levels, equip scientists with the skills to work in collaborative settings and to develop broad-gauged approaches to complex topics such as cancer epidemiology and prevention. TD training programs present students with collaborative opportunities that hone their ability to coordinate with colleagues from different fields and cooperate with them as participants in TD teams. Moreover, TD-trained scholars may be more likely to compete successfully for job positions in ID fields that have experienced tremendous growth in recent years (Chang et al., 2005; von Ruschkowski, 2003). Whereas TD training is associated with several potential opportunities, earlier studies have identified certain barriers associated with CD approaches to education. The next section discusses some of the challenges and constraints faced by TD trainees as well as certain factors that can facilitate positive training outcomes.

Challenges Associated with TD Training Programs

Achieving and sustaining transdisciplinarity is a difficult task. Personal interests, values, attitudes, and intellectual orientations play an influential role in determining whether scholars are able to navigate disciplinary boundaries, make integrative theoretical leaps, and become successful collaborators or leaders in team science endeavors (Mitrany and Stokols, 2005; Nash et al., 2003). TD learning can be constrained by exclusionary ways of thinking, methodological rigidity, pessimism about the value of TD work, closed-mindedness, and lack of respect toward divergent

discipline-based epistemologies (Bradbeer, 1999; Stokols, 1998). It may be counterproductive to thrust individuals into TD training programs and teams without regard to their personal and intellectual dispositions. Inconsistency between such dispositions and a given academic or research program may lead to confusion, conflict, and eventual retreat into the familiar domains of their academic disciplines. There is a need to develop targeted recruiting strategies that effectively channel intellectual interests and inclinations of promising undergraduate, graduate, and post-doctoral TD scholars into CD training programs for which they are well suited.

Even among trainees who are inclined toward CD education, learning to accommodate, assimilate, and integrate knowledge from disparate fields can be very challenging and requires sufficient time. For example, a post-doctoral scholar who is proficient in biology may find it very difficult to grasp abstract psychological or sociocultural concepts in his/her efforts to bridge levels of analysis. Further, the TD trainee must not only learn to understand and converse in the specialized languages of different disciplines (Kahn & Prager, 1994; Kessel, Rosenfield, & Anderson, 2008; Morgan et al., 2003; Rhoten & Parker, 2004; von Ruschkowski, 2003), but must also develop an innovative hybrid language, conceptual frameworks, and methodological approaches that bridge two or more fields (Nash, 2008). These tasks require the TD trainee to work within ambiguous and unstructured spaces between disciplines where constructs, theories, methods, and training objectives are yet to be defined. Mentors (even in the multi-mentor training model) are often only familiar with the theories and methods of their specific discipline and as such can only provide limited guidance to trainees in their efforts to traverse and negotiate the unchartered territories between disciplines and analytical levels (Kahn & Prager, 1994; Nash, 2008).

Whereas the process of navigating disciplinary boundaries eventually can result in the development of novel theoretical frameworks and methodological approaches that bridge multiple fields, it is important to ease the difficulties that TD trainees face by developing innovative mentoring practices. For example, mentors participating in TD training programs should be trained to be aware of and sensitive to the challenges faced by their advisees and acquire as much direct experience as possible with TD scientific collaborations. Mentors should not only be responsible for guiding trainees through the terrain of their own discipline but also assist them in their efforts to learn about different fields and to transcend boundaries of disciplines. These training processes can be facilitated if the mentor shares a TD orientation with the mentee as well as through frequent face-to-face and electronic communication (Kessel et al., 2008; Misra et al., 2009; Nash, 2008).

To be effective TD scientists, trainees should be able to establish and sustain collaborative relationships that reach across disciplinary and institutional boundaries (Kessel et al., 2008; Nash, 2008). This requires the trainee to engage with dissimilar academic cultures and manage conflict arising from contrasting scientific worldviews, prejudices, and rivalry among departments (Campbell, 1969). TD mentoring practices should include exposure to collaborative leadership styles and communication skills, as well as interpersonal, managerial, and technological skills to foster relationship-building skills. To ensure the success of TD training, Nash

(2008) recommends the development of individualized training plans that (1) allow adequate time for the trainee to establish relationships across departmental lines; learn diverse discipline-based terminology, concepts, and methods; and acquire a TD ethic; (2) focus on a specific research problem with the goal of mastering problem-relevant theories and methods rather than attempting to master several different fields simultaneously; and (3) balance the scope or breadth of the disciplines included in the training program according to the trainee's interests and aptitudes, since broad-gauged TD training that bridges multiple disciplines and analytical levels can be difficult to achieve, especially for a student who is new to TD research and practice.

It is important to be aware that significant impediments to TD training are created by traditional academic organizational and institutional structures (Campbell, 1969; Nash et al., 2003; Nyden, 2003; Rosenfield, 1992). Departments and institutions vary with respect to their academic philosophies and openness to collaborative enterprises. Hierarchical organizational structures, departmental competition for resources, and lack of co-ordination between academic departments can hinder CD teaching and learning and obstruct cross-departmental collaboration. The lack of departmental or institutional funding for CD courses is another disincentive for TD training. University and department policies should be reformed to support the financial and structural needs of TD training programs. This requires the development of comprehensive TD training strategies that support the needs of senior investigators charged with managing large- or small-team science initiatives as well as all other levels of training.

Additional challenges faced by TD scientists are the risks and uncertainties associated with choosing a TD career trajectory. TD scientists often report feeling undervalued and do not identify with any single discipline (Chang et al., 2005; Mitrany & Stokols, 2005; Nash et al., 2003; Rhoten & Parker, 2004; von Ruschkowski, 2003). TD scholars, in some instances, may be less competitive for job positions within traditional academic units and can face difficulties and uncertainties associated with UD academic structures and reward systems. For instance, publishing research or securing grant funding for research that does not lie in the purview of the domain of any one academic discipline can be quite challenging because not all reviewers are familiar with TD scientific approaches (Kessel et al., 2008; Nash, 2008). Junior TD scientists also can encounter obstacles when their work is reviewed by tenure and promotion committees whose members are skeptical of co-authored publications spanning multiple fields and regard those less highly than single authored UD publications. A change in institutional policies for promotion and tenure at multiple levels as well as a more fundamental shift in academic structures, reward systems, and norms are needed if the difficulties and uncertainties faced by TD researchers are to be addressed.

In summary, the following institutional level factors appear to facilitate effective TD training: (1) adequate funding from public and private agencies over extended time frames and regular and effective co-ordination and communication between funders and training directors, so necessary to sustain TD programs, especially in terms of creating the requisite organizational, institutional, and technological

infrastructure needed to implement and evaluate TD curricula, and to sustain adequate levels of funding for trainee and research staff stipends; (2) appointment of effective training program leaders and mentors who are well-respected, trusted, and have exceptional negotiation, conflict resolution, interpersonal communication, and managerial skills; (3) provision of opportunities of TD trainees and faculty from different disciplines to meet and exchange ideas in the context of forums, retreats, and regular meetings, along with spatially proximal office and lab spaces and electronic (e.g., Internet, intranet) networks to foster regular communication among team members; (4) adequate space for TD training and research activities; and (5) implementation of multi-level policies and administrative structures to facilitate cross-departmental collaboration.

Conclusions and Directions for Future Research

This chapter has provided an overview of the current state of knowledge in the area of TD training and education. The distinctive features, goals, and key components of effective CD training were presented. Examples of TD training models at undergraduate, doctoral, post-doctoral levels were described in terms of their curricular components and aims. Further, a brief overview of the methods and metrics available for evaluating the processes and outcomes of TD training initiatives was provided; and the results of recent studies examining the short-term outcomes of TD training at undergraduate and doctoral levels were discussed. Finally, an account of the intrapersonal, interpersonal, and organizational challenges and constraints associated with TD training was provided and promising strategies that have the potential to facilitate successful TD training were identified.

The field of TD training as a subarea in the science of team science (Stokols et al., 2008) is an emerging research area that poses several questions for future investigation. Among the conceptual and methodological issues that warrant future study are: (1) the development of theoretical frameworks to account for the circumstances under which TD training initiatives are more or less effective; (2) the creation of new methods and metrics to assess the relative influence of various curricular components and intervening processes on the short-term and longer-term outcomes of TD training at various levels; (3) the evaluation of TD training outcomes at different stages of scholarly or professional development; (4) direct empirical comparisons of TD training programs with MD, ID, and UD approaches; and, finally, (5) longitudinal studies of TD training programs to gauge their long-term scientific and societal value relative to UD training programs.

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Chapter 11
Funding Agencies and Transdisciplinary Research

Joy L. Johnson and Sharon Hrynkow

As national health research funding agencies work to fund excellent and innovative research, the continual adaptation of programs and approaches is essential. In Canada, the mandate of the Canadian Institutes of Health Research (CIHR) is to create new knowledge that will benefit the health of Canadians. In the United States, the mission of the National Institutes of Health (NIH) is to support science in pursuit of fundamental knowledge about the nature and behaviour of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability. Both agencies adapt programs and practices in order to maximize new technologies or strategies to most effectively develop knowledge to meet pressing health needs. There is a growing recognition that transdisciplinary (TD) approaches provide new knowledge and insights for improving human health. To illustrate the ways that funding agencies are responding to the need to support TD approaches, we describe funding programs supported by CIHR and NIH and illustrate challenges and opportunities in funding TD research approaches for the improvement of human health.

In order to understand how transdisciplinarity may best be adopted within a health research infrastructure, it is useful to first review the values and principles that inform funding agency approaches. These values include supporting scientific excellence, working for the public good, encouraging freedom of inquiry, innovation, and fostering transparency and accountability. However, in the process of supporting research activities in line with these values, tensions can arise. For example, innovation and scientific excellence can sometimes seem at odds because work that is "cutting edge" or innovative, such as TD research, might not be viewed, at least initially, as having the same scientific grounding and rigour as more "tried and true" approaches with well-accepted methodologies. Similarly, research that relies on emergent methods and participatory approaches might not initially seem to offer the accountability of more prescriptive approaches.

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Both CIHR and NIH share a common culture of working to enhance public health though research, and both institutions support multidisciplinary, interdisciplinary, and TD programs (although there is a lack of consistency related to how these terms are applied). In Canada, the year 2000 transition of the Medical Research Council of Canada to the current CIHR structure was based on the recognition that a broader vision was required to address the pressing health issues of Canadians. The Minister of Health at that time stated, "The CIHR will help to integrate health research activity by fostering linkages and breaking down barriers that have existed among the different fields of health research: bio-medical research, clinical research, research reflecting health systems, health services, the health of populations, societal and cultural dimensions of health and environmental influences on health" (Health Minister Alan Rock, Health Canada Online, 1999). In the United States, Dr. Elias Zerhouni, Director of NIH between 2002 and 2008, worked to break down disciplinary barriers in support of medical research by launching the NIH Roadmap for Medical Research in the twenty-first century (http://nihroadmap.nih.gov/). Both of these leadership actions provide the underpinning for current and future TD funding programs.

Despite the fact that CIHR and NIH support TD health research, both institutions have faced several challenges in launching, reviewing, and funding these initiatives. We describe some of these challenges including definitional challenges, identifying effective TD teams and support team development, designing effective requests for proposals, supporting an effective peer review, and assisting teams with sharing resources. We provide key examples of ways that NIH and CIHR have addressed these challenges.

Definitional Issues

Various component agencies of both CIHR and NIH support TD programs, but neither agency has adopted a single definition of transdisciplinarity that would allow comparisons of efforts across programs and constituent agencies. Indeed, a review of CIHR and NIH documents suggests that the terms *transdisciplinary*, *interdisciplinary*, and *multidisciplinary* are often used interchangeably. If TD approaches are to be fostered in the future, clear conceptual and operational definitions need to be developed. Developing these definitions will help funding organizations design appropriate requests for applications (RFAs) and design evaluation criteria so that the outcomes and impacts of different approaches can be clearly delineated.

Supporting TD Teams

TD research requires a team approach. Health research funding agencies continue to work on the identification of the most effective means to support teams of scientists and to predict which teams will be successful. To support the work of TD research

teams, funding agencies have used a variety of funding programs. At the heart of all of these approaches is the assumption that teams provide an "added value" that stems from the synergy of many perspectives and leads to innovation, progress, and complex problem resolution. The validity of this assumption has been debated, and in response to this debate, the field of team science is beginning to evolve. Research in this area determines the circumstances that facilitate or hinder TD team approaches. This work is important to funding agencies because it helps inform decisions about which teams have the "right ingredients" for success.

A major concern in the funding of TD teams is that these teams take time to develop: time is required to establish trust among the various team members, to establish common project goals, to learn each others' technical languages, and to sort out what might be possible in the context of a research project. The "upfront" work required for these projects is extensive, and funding agencies need to find ways to support these team development costs. Funding agencies are addressing this issue through several mechanisms. First, a staged proposal process is often used. For example, at CIHR, team competitions are often designed so that once an initial letter of intent is reviewed and approved, teams are awarded funds to meet and develop their full proposal (Box 11.1).

Box 11.1 Supporting team development

The CIHR Reducing Health Disparities Initiative was a strategic research initiative addressing the reduction of health disparities and the promotion of equity for vulnerable populations. One large request for applications (RFA) that grew out of this initiative was the funding of interdisciplinary capacity enhancement teams. Prior to launching this team funding opportunity, a great deal of developmental work was completed. This work included consultation with the community to determine whether there was capacity to conduct this research and to hone the direction of the RFA. Recognizing that teams required support to form and become organized, initially 1-year pilot project grants and development grants were launched, the aim of which was to build research capacity to document, analyse, and contribute to reducing health disparities and to promote equity for vulnerable populations. With this foundational work completed, a full call for team proposals was developed and launched.

The call for proposals for teams placed an emphasis on high-quality research; the involvement of policy makers, practitioners, and general community; and the transfer of useful knowledge. The initiative aimed to exert a national as well as international impact on health status, health behaviours, and the use and delivery of health services. This strategic initiative was intended to provide support for new or existing interdisciplinary research teams to describe, investigate, and ultimately help reduce health disparities.

While the term "interdisciplinary" was used in the RFA, the aims and objectives of the opportunity were in line with a TD perspective. For example, teams were defined as a group of researchers from a variety of disciplines and more than one institution or a variety of faculties, departments, institutes, or centres within a single institution, working collaboratively on projects that fall within one or more identified priority areas. In addition, team members needed to be associated with two or more of CIHR′s health research pillars/themes. To ensure the projects were relevant to the community, at least one team member needed to come from a Canadian not-for-profit or community organization.

The specific objectives of this initiative were

- To support targeted capacity building in research thematic areas identified in this strategic initiative.
- To better position teams of researchers for accessing CIHR and other open competitions for research funding.
- To promote networking and mentoring among researchers from different disciplines and between institutions.
- To promote the development and maintenance of multidisciplinary teams that conduct transdisciplinary research in strategic thematic areas.
- To create opportunities and initiate career paths for young and established investigators who are new to conducting health research, or transitioning to different areas of health research.
- To facilitate the integration of knowledge translation plans and activities into routine activities of research teams.

The funded teams are addressing a myriad of issues directly and indirectly related to urban health topics including areas such as access to care for aboriginal peoples; homelessness, housing and health; enhancing resilience of youth; and enhancing the use of antiretroviral therapies among survival sex workers.

Another mechanism is appropriate if TD collaboration evolves naturally as a result of many years of support for more disciplinary-specific programs. For instance, the National Cancer Institute of the NIH and its partners developed a TD program to combat tobacco use that originated after consideration of progress gained over many years through previously supported programs. TD centres were developed to bring the best of many disciplines into the same research arena, allowing investigators within the network to learn from each other. In this case, transdisciplinarity emerged as an appropriate approach to solve the problem of tobacco use.

Efforts are also being made to train researchers to work across disciplines. For example, CIHR launched a Strategic Training Initiative in Health Research (STIHR)

program that provides competitive funding for innovative TD training experiences. This program was developed because of the recognition that researchers are not always properly equipped to engage in TD team research and training programs emphasize the skills required to work in teams and manage complex projects. Similarly, the Fogarty International Center of the NIH launched a unique training program to encourage new global health training partnerships. The resulting Framework Programs in Global Health "glues" together schools of business, law, journalism, and others with traditional Fogarty grantees in public health and medicine in order to create novel global health curricula for undergraduate and graduate students (Box 11.2).

Box 11.2 Training the next generation of TD scientists

Training of the next generation of researchers is part of the core mission of both CIHR and NIH. Both agencies support training programs aimed at creating broadly skilled professionals using interdisciplinary and TD approaches. In Canada, the Strategic Training Initiative in Health Research (STIHR) program was launched as a way for Canada to increase its international competitiveness in attracting new, bright, creative research talent and to ensure innovation and excellence in the next generation of Canadian health research training programs. CIHR recognized that health research is undergoing a revolution, characterized by the convergence of mathematics, humanities, and the physical, social, biological, behavioral, and clinical sciences. Funding for these training programs is provided by CIHR and its partners. The first STIHR competition resulted in 51 training programs being funded in March 2002. An additional 35 programs were funded in April 2003, and others have been funded through competitions held since 2003.

The objectives of the STIHR program are to support the development of training programs that improve the mentoring and training environment for health researchers; support the development of collaborative, team research by bringing researchers together from different disciplines to address major health issues and/or health research challenges; and support the development of well-rounded health researchers by integrating training on the ethical conduct of research and related ethical issues; knowledge translation; and professional skills such as communication, teamwork, project management, leadership, grant writing, and peer review.

The Fogarty International Center (FIC) of the NIH supports research–training programs on global health challenges, including AIDS and emerging infectious diseases, in universities in the United States, working closely with partners in resource-poor nations. In 2005, a new training program was launched as a means to bring non-traditional disciplinary partners into global health research training and to increase momentum on global health as a career

path for undergraduate and graduate students. Applications for the Framework Programs in Global Health were sought from teams of educators and scientists from across universities, allowing colleagues from business, journalism, anthropology, agriculture, and other disciplines to team up with more traditional partners from schools of medicine and public health. Applications focused on curriculum development on global health for Master's students and undergraduates and activities that fostered true cross-university engagement such as creation of global health resource centres. Awardee institutions (www.fic.gov/) were encouraged to match Fogarty funding levels as a means to deepen support for the concepts over time.

One of the programs illustrates both the interdisciplinary and the TD natures of the activity. Harvard University's program, led by Dr. Wafaie Fawzi, focuses on Fostering Opportunities for Nutrition and Global Health. Awarded in 2008, the program recognizes that malnutrition is the leading cause of death and disability worldwide and is a major impediment to population health and economic development. Recognizing further that urbanization and associated changes in diet and lifestyle patterns have contributed to the rapid emergence of chronic health conditions in poor nations, Dr. Fawzi and partners at the Harvard School of Public Health, Harvard Medical School, Kennedy School of Government, Graduate School of Education, and Faculty of Arts and Sciences are partnering with St. John's Research Institute in Bangalore, India, and additional partners in Tanzania and Brazil to provide training on the centrality of nutritional factors in global health. Experts involved in the program are from the nutrition and infectious disease communities; nutrition and maternal and child health communities; and nutrition and non-communicable disease communities. The 3-year effort provides training on nutrition and global health, develops new curricula and courses, offers internships to students from Harvard matched with students at collaborating sites, and creates a seminar series and annual symposium on nutrition and global health.

These training programs suggest that a range of expertise included in the development of the curriculum and training programs has proved to be of great benefit. Cross-talk among the disciplinary experts has yielded insights that have allowed new training tools and materials to be developed. The "gluing" aspect of the Framework Program at Harvard University, for example, has allowed the study director to strengthen links across Harvard and with partners abroad. While many of the working relationships with counterparts in Tanzania, India, and Brazil had been developed previously over years and are based on other projects, the financial support provided through the Framework program was found to be important in fostering new levels of engagement. Support for long-term relationships is expected to yield dividends as future challenges arise. It is expected that the dynamic nature of these training programs will attract more students into health research and into

arenas, including global health, that include important elements of public health, social, behavioural, and political sciences.

The Need for and Design of Requests for Proposals for TD Health Research

TD approaches are clearly not required for all problems addressed in health research. Generally these approaches are required when the problem is sufficiently complex that multiple perspectives, including a community perspective, are required. One of the first programs CIHR launched that required a TD approach was the Community Alliance for Health Research (CAHR) program. Launched in 1999, the intent of the CAHR program was to foster excellent research *of relevance to community groups and agencies* in four themes of health research: biomedical, clinical, health services, and systems and population health including the social, cultural, and environmental determinants of health. The program facilitated mutual learning and collaboration among community organizations and partnerships with researchers based in local universities, hospitals, and other not-for-profit institutions. In addition to contributing to the improved health and quality of life in communities involved in CAHRs, the program provided unique opportunities for training of health researchers in all disciplines. Over the life of the program, 58 teams were funded. Many of these teams addressed issues that are central to urban health such as improving HIV prevention and healthcare delivery for users of injection drugs, improving healthcare access for vulnerable populations, and involving the public in health decision making. What was unique about this program was a commitment to funding research that was responsive to community health concerns.

Developing strategic requests for proposals that can be easily understood and that make clear the need for TD approaches is another operational challenge. Most national funding agencies hold open research competitions in which health researchers put forward their best "investigator-initiated" ideas for research projects. These research proposals are judged by and large by standing panels of experts, many of which represent a single discipline or a field of study and are highly specialized. Those projects deemed to be most meritorious are recommended for funding. A second form of competition is referred to as "strategic competitions". These types of competitions are specifically developed in order to address a gap in knowledge or to stimulate more research in a particular field. In both the NIH and CIHR systems, strategic competitions may be driven by individual institutes, by collections of institutes, or, in the case of NIH, by one of the offices of the NIH director. Strategic research initiatives play a key role in shaping TD research opportunities, in large part because they create the necessary impetus for teams to come together and seek funding.

There are several factors that contribute to a TD research proposal: (a) a team that includes academics, community members, policy makers, and practitioners; (b) an approach that integrates and extends discipline-based concepts, theories, and

methods to address a common research topic; and (c) an action-oriented focus on a problem. But simply requiring that these ingredients be included in a proposal is not enough. As Rosenfield (1992) reminds us "Creative collaboration requires more than social and medical scientists working on the same problem as part of the same team. To achieve the level of conceptual and practical progress needed to improve human health, collaborative research must transcend disciplinary perspectives and develop a new process of collaboration" (p. 1344).

At CIHR, the model of transdisciplinarity has grown out of a perspective that recognizes that health research occurs across four "pillars", or substantive foci: biomedical, clinical, health systems and services, and population and public health. These pillars are now firmly established in the nomenclature of CIHR. When requests for TD research applications are launched, there is discussion about how many pillars need to be represented by the members of the research team. CIHR institutes are encouraged to develop strategic initiatives in partnership with other institutes and funding agencies, which also fosters transdisciplinarity. Prior to launching several strategic initiatives, particularly large initiatives, there is often a process of consultation with relevant stakeholders. This helps to ensure that the request is crafted in such a way that it is responsive to the emergent needs in the field.

Peer Review of Multidisciplinary and TD Research Funding Opportunities

While the peer-review system is viewed by many as the gold standard for allocation of research funds, emergent areas of scientific pursuit such as TD research are at times underfunded because one's peers have yet to see the merits of new research approaches. The traditional peer-review system is based on the notion that one's peers in a given discipline are best equipped to judge the merits of a proposed research project. Projects are judged based on their potential for contribution, soundness of methods, feasibility, and the quality of the researcher or research team, and the research environment.

In their review of challenges related to interdisciplinary health research (IDHR), the expert panel of the Canadian Academy of Health Sciences (CAHS) stated, "Perhaps the greatest challenge for the funding institutions that support IDHR is that of ensuring fair peer-review of IDHR proposals". When a project team represents upwards of seven disciplines and also includes community members and policy makers, and they are proposing to develop new methods and approaches to address a unique and complex problem, what would constitute an appropriate peer review? Who is a peer in this case? Different disciplines often have different appraisal standards and criteria for evaluating research proposals. This makes the difficult task of coming to agreement about the quality of a research proposal even harder (Mansilla & Gardner, 2003). How can we ensure that a complex TD research project receives a fair review when it is being judged alongside less complex research projects? The CAHS expert panel cautioned that both the structure of the peer-review process (with normally two assigned reviewers) and the high

esteem of these "unidisciplinary experts" means that unidisciplinary assessments of interdisciplinary proposals frequently go unchallenged by fellow panel members.

At CIHR peer-review committees for strategic initiatives are formed based on the specific requirements or the RFAs and on the types of grants that are received in the competition. This process helps to ensure that there is appropriate expertise at the table. In addition, when TD research is being considered for funding, reviewers are sought that have an appreciation for and expertise with TD research (Box 11.3).

Box 11.3 Ensuring appropriate peer review

The National Cancer Institute (NCI) of the NIH supports a range of TD programs including one that focuses on reducing tobacco use, the TTURCs. The TTURC concept evolved from informal conversations among researchers and policy makers at a July 1998 conference – "Addicted to Nicotine" – cosponsored by the National Institute on Drug Abuse (NIDA), Robert Wood Johnson Foundation, NCI, and the Centers for Disease Control and Prevention. As a follow-up to that conference, NCI established a Tobacco Research Implementation Group (TRIG) to examine past programs, reports of advisory groups, and experience in tobacco cessation and prevention efforts. The TRIG reached consensus that "... a comprehensive but focused program of research on tobacco use can help to reverse the epidemic of tobacco-related cancers (http://dccps.nci.nih.gov/TCRB/TRIP/html/summary.html). Specifically, the group stated that earlier reports had produced major recommendations for tobacco control research, but none of them considered the entire spectrum of tobacco control research from basic biological research to dissemination research. And, while some of the recommendations of earlier reports had been implemented, there was a sense that a more comprehensive approach would yield higher impact.

Several months later, the TRIG recommended TD centres as its highest tobacco use research priority. Within a year, NIDA and NCI jointly issued a request for applications from academic centres interested in developing such centres. In 1999, the first TTURCs financially supported by NCI, NIDA, and Robert Wood Johnson Foundation. TTURCs represent a natural progression of understanding of complexities of tobacco use, involving basic neuroscience and behavioural dimensions and a backdrop of socio-economic and cultural factors.

Seven TTURCs received support (see http://cancercontrol.cancer.gov/tcrb/tturc/). Two rounds of proposals for support have been reviewed. In both rounds, applications were reviewed by ad hoc special emphasis panels. Reviewers were of two sorts: disciplinary experts in tobacco and nicotine and a smaller set of experts on team science, interdisciplinarity, and transdisciplinarity. The role of the TD experts was to review each application using the specific TD lens: Did the application truly represent an approach that was

greater than the sum of the parts? For review of the first round of awards, significant efforts were made to bring all review team members up to speed on what the sponsors were looking for in terms of TD applications. During the second round of review, 5 years later, program and review staff did not need to spend as much time on initial orientation.

Orientation of the review panel to specific expectations on transdisciplinarity took time, but the efforts were well worth it as judged by several characteristics. First, new awards were multidisciplinary and also had some level of TD features. Second, as the centres have matured, they have become even more diverse in terms of disciplines. Third, in a paper aimed at assessing the level of collaboration and transdisciplinarity across TTURCs as determined by a range of factors including satisfaction with the collaboration, impact on collaboration, trust and respect, and level of transdisciplinarity, it was found that perceptions of centres making good progress in creating new methods and interventions were correlated with the centre's perceived level of transdisciplinarity (Masse et al., 2008). Astute reviews of the proposals, including the essential feature of TD experts, are critical to ensuring that the best TD centres, and the ones with greatest promise, are identified.

As mentioned above, conducting TD research is time consuming and difficult. Not all teams succeed in working effectively. In addition to reviewing the scientific merit of a proposal, peer-review committees are also seeking evidence that the team has the necessary ingredients to be successful. In a meta-analysis examining the relationship between management team design and team performance, Stewart (2006) found that three factors were related to positive outcomes of management teams including leadership (transformational and empowering leadership), team composition (ability, expertise, and disposition to collaborate) and task design (meaningfulness of the task for the team members). Only a handful of studies have been conducted that specifically focus on research teams in the health context, and most of this is grey literature. A review of this literature revealed that a moderate level of team diversity and close physical proximity of team members positively affect team performance (CIHR, 2008). An expert on team science, Mary Lidstom, Vice Provost of Research at the University of Washington, summarizes five key areas for successful TD teams: leadership; communication (time effort, technology, training); management structures (integrated leadership and communication); team-friendly environment; and institutional commitment (space, administrative support) (Lidstom, 2009). These are qualities that should be apparent in any team research proposal. Peer reviewers look for a description of how the team will function, who will provide leadership, and how tasks will be achieved.

An evaluation of transdisciplinarity was conducted after 4 years of support of the NIH funded Transdisciplinary Tobacco Use Research Centers (Stokols et al., 2003). This evaluation found that there was significant intellectual integration within and between the centres and that behaviours of investigators towards their programs

and that of others in the network changed over time, reflecting levels of increasing transdisciplinarity. Further, it was observed that individual centres achieved transdisciplinarity through avenues that differed from other centres in the same network. Reviewers should maintain flexibility therefore when considering the potential merits of TD research proposals: no "one-size-fits-all" approach is useful.

Sharing Resources

A final challenge relates to how recognition for TD work is bestowed. As with other forms of team science, how to share recognition and research funds across TD team members remains an area of great importance. How to include and recognize contributions for community members is a particular area of interest. How to distribute funds across several research institutions, taking into account overhead and other factors, is a logistical feat. Some projects require that funds be distributed to a number of sites, but the complex (and necessary mechanisms) for fiscal accountability can make this challenging. Rosenfield (1992) lamented over 15 years ago that there is little recognition given to those who work with other disciplines. This work is time consuming and the development of products from this work can be delayed. In addition, at times the research products need to take a variety of forms including community reports, policy briefs, and web-based information. Unfortunately, publications in journals with high impact factors are often considered the sine qua non of research productivity. Changes are required to recognize the value inherent in solving complex health problems and developing research products that make a real difference.

Lessons Learned and Future Trends

While some confusion over meanings of interdisciplinarity, multidisciplinarity, and transdisciplinarity permeate hallway conversations and more formal exchanges, awareness is growing within the research community as to the value of TD approaches. One clear benefit of TD approaches is that they are oriented towards solutions that can be applied to real-world problems in the community. With this awareness, demand for research funds to support TD research is increasing, and funding streams are opening up to support TD work. At the same time, agencies are actively working to address the mechanics of supporting TD teams (e.g., peer review, allocation of funds, recognition). While the outcomes and impacts of the work of the teams will take an extended period to realize, it is clear that TD approaches are working to push specific fields forwards.

Operational aspects of TD research are improving. Peer review using TD experts to complement disciplinary experts works well to identify top science and TD approaches. Networking among TD centres and teams allows for exchange of best

practices and ideas and can lead to greater transdisciplinarity than was originally conceived in individual grant proposals.

One key challenge that remains is how to transform a group of individual researchers from different disciplines into a TD team. There are countless examples of project teams who at the outset of their work have suggested they are TD, but they are unable to move beyond their relative fields. Our understanding of how to predict which conditions will favour the likelihood of success of one team over another and how to maximize transdisciplinarity itself within the team is imperfect. The science of transdisciplinarity, that is how these teams can successfully function, is gaining the attention of researchers and funding agencies.

Finally, as we work to address increasingly complex public health problems, including the links between climate change and health or the continued spread of HIV/AIDS and other so-called emerging infectious diseases, TD approaches hold promise. Training of the next generation of researchers to understand key concepts and to deploy them as part of vibrant research teams of the future is a core value that we must pursue. With the progress observed thus far with TD approaches, we are optimistic for the future.

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Chapter 12
Moving Forward: The Future of Transdisciplinary Health Research

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The chapters of this book paint a picture of urban health research today. As discussed in the introductory chapter, the field of urban health is still relatively new and can comprise myriad research agendas, for example, a focus on the lives and health of specific inner-city populations (e.g., homeless adults, people experiencing mental health problems), the well-being and problems of slum dwellers, exposure to health hazards common in urban areas (e.g., pollution), or access to sound housing and clean water. While our contributors focus on the North American context (with the exception of Roberts and her colleagues who discuss Scotland in Chapter 6), the field of urban health is increasingly focused on cities in the developing world, as this is the site of the greatest social and health inequalities along with the largest challenges for implementing solutions (Galea & Vlahov, 2005; World Health Organization, 2008). These foci call for the adoption of multifaceted research approaches with which to examine and address the complex health problems that arise in these contexts.

The contributors to this book are experienced in and recognize the importance of collaborating with experts from varying fields as well as with non-academics to address the multifaceted and complex problems of urban health. In so doing, their work moves beyond interdisciplinary collaboration toward transdisciplinary (TD) science. As discussed in Chapter 1, we define TD research as a team science that is problem-focused and in which members draw on various fields of expertise and experience to jointly develop a new understanding of a particular phenomenon. In this manner, TD team members create an integrated framework that moves beyond disciplinary theories, concepts, and methods. An important component of TD research is the fact that all types of expertise are considered equally valuable. Moreover, TD research is action oriented. An essential factor of this approach is the ongoing translation of research findings into practice to achieve social change.

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Benefits and Challenges

As the contributors to this book aptly demonstrate, a TD research approach is an appropriate method for the study of complex and multi-dimensional urban health problems. Several authors – community partners and academic researchers alike – have noted the benefits and challenges of specifically undertaking TD research over other types of research. Interestingly, but perhaps not surprisingly, the benefits of TD research prioritized by community partners differed slightly from those articulated by academic researchers. Community partners appreciated that TD research accommodated the dynamic nature and complexity of the problems they faced, in a manner appropriate to a focus on the needs of very low-income urban populations. The emphasis of the knowledge translation component of TD research on both the prioritization of community needs and the ability of community to control dissemination of findings was also seen as beneficial over more traditional non-TD research. This latter issue was thought to facilitate the quick movement of research into practice and also to ensure that research contributed to social change. One particular advantage of TD research articulated by community is that it brings research-related resources (e.g., research skills and literature) to settings where such resources are typically scarce. An additional point noted by both community and academic partners is that certain skills are required for community-partnered TD research, skills such as learning about and adopting a broader understanding of problems and maintaining strong partnerships across varied areas of expertise. They also noted that special effort is required to learn and maintain these important skills.

The initiation of a TD project is almost always more labor-intensive and requires greater management of complex relationships than a comparable unidisciplinary project. Decisions regarding team membership, how the group will be led or coordinated, and even agreeing upon basic premises on which the research will be built can be difficult, potentially contentious, and time consuming. Bringing diverse groups of people together can result in significant conflict unless members bring an attitude of openness, respect, and mutual learning to the table, and that group dynamics are handled appropriately and skillfully. Unlike projects with a single dominant leader or a rigid hierarchical structure, efforts that are truly TD must overcome challenges in ensuring equitable partnerships and collaborative decision-making in a setting where power imbalances and some degree of conflict are expected. As the case studies in this volume demonstrate, TD teams often force academic and community-based investigators to negotiate a shared vision despite an initial starting point of what may be substantially different collaboration agendas. In this respect, TD research can learn from the extensive experience of those who have engaged in community-based participatory research over the last few decades (Flicker, Savan, Kolenda, & Mildenberger, 2008; Leung, Yen, & Minkler, 2004; Minkler & Wallerstein, 2008).

Academic partners identified slightly different benefits of TD research. In particular, academic partners noted that much (non-TD) research is often focused on problem identification or even theory development while TD research increases the

likelihood that research will be solution-oriented. Because of the multiple disciplines involved in conducting TD research, another benefit is the wider range of methods that are available to utilize in such projects. As a result of the wider range of disciplines and methods available, team members are better equipped to point out design flaws or identify threats to feasibility or validity. Yet, in the area of challenges, academic partners bemoaned the continuing reality that TD research (like community-based participatory research) faces substantial challenges to obtaining support and acceptance within academia. As noted in this volume and other work on TD research, these barriers may compromise career development and promotion opportunities. University departments continue to favor disciplinary research and make decisions regarding hiring and tenure based on merits defined according to traditional disciplinary criteria. The peer-review granting process is often strongly skewed in favor of those who adhere to the tried-and-true established methodologies of a single discipline rather than those who work at the boundaries between and among disciplines. When projects are completed, TD researchers face a relative paucity of appropriate academic outlets for their work, including academic conferences for presentations and peer-reviewed journals for TD research articles. In addition, when articles are published, the size and complexity of TD teams may result in sub-optimal academic recognition due to the large number of authors on publications and uncertainty regarding the relative contributions of the various authors. As a result, the TD researcher may end up feeling undervalued and underappreciated compared to an academic at a similar stage in his or her career who has chosen to identify with a single established discipline.

An essential and truly challenging task for TD team members is the need to critically examine their own assumptions, whether those based on disciplinary paradigms, personal experiences, and perspectives or other deeply held values and beliefs. This process does not require individuals to simply abandon their positions or yield to other team members to avoid conflict; rather, the dialogue that ensues is intended to lead to a deeper understanding of the problem in all its multifaceted complexity. This work can, however, be discomfiting. It also requires great effort for team members to share and absorb large amounts of new information and concepts related to the topics or issues being examined. At times it can be difficult for a TD project to find the correct balance between the need for further knowledge sharing and the point of satiation or information overload (as discussed in Chapter 8). These challenges are only accentuated by the communication difficulties that can arise when community and academic team members, or individuals from different academic disciplines, attempt to learn to speak a common language. In particular, frequent reliance on jargon and the use of confusing or conflicting terminology by different disciplines can pose real barriers to TD communication.

The evidence generated by TD research is a key product from these efforts and can be viewed in two potentially contradictory ways. On the one hand, TD research, because of the close involvement of non-academic partners, has the potential to be very responsive to the needs of key stakeholders. This benefit was evident in the perspectives of community partner authors who contributed to this volume. On the

other hand, TD research faces the additional challenge that different team members may have different definitions and understandings of what constitutes the best research evidence. Complicating the issue is the fact that different academic disciplines accord different values to various sources of evidence and methodologies. For example, disciplines like medicine view quantitative data from controlled trials as being the best form of research evidence, whereas other disciplines such as anthropology prize the qualitative analysis of historical data. To complicate this even further, some TD team members may assign much greater weight to the lessons of those with lived experience, the voice of community consensus, and the wisdom of past generations.

Future Directions

While we have tended to emphasize the seemingly daunting challenges of TD research, they reflect the realities of the early growth phase of any new endeavor. It is clear that the contributors to this volume endured in their efforts as they felt that the benefits outweighed the challenges. Moreover, transdisciplinarity is an increasingly popular framework and is growing in the area of urban health. Given the many contributions highlighted throughout the chapters of this book, we must now consider the future directions of transdisciplinarity and the best path with which to advance this promising research approach in the area of urban health to overcome the above-mentioned challenges.

Training: As highlighted in several of the chapters in this book, encouraging inroads have been made in the area of training in TD health research. Training is a cornerstone to the advancement of the TD research approach, given the need for specialized collaborative, methodological, and theoretical skills to fuse disciplines and build common conceptual frameworks that address complex urban health issues. As outlined in Chapters 1, 10, and 11 of the book, the number of training programs in North America devoted to TD health research is increasing rapidly. These programs importantly incorporate cross-disciplinary scientific training and provide instruction on collaborative processes such as the building of inter- and intra-personal skills needed to manage relationships when working across disciplines and perspectives. Based on discussions in several chapters, these valuable training experiences should be supplemented with further training on establishing equitable and respectful partnerships with non-academic partners and guidance to effectively implement integrated knowledge translation throughout projects.

Increased institutional support: TD research and training opportunities are greatly affected by academic institutional support and, despite a growing number of training programs and burgeoning recognition of the value of this approach for solving complex health problems in urban settings, institutional support for the sustainability of TD research beyond training is uncertain. As mentioned earlier, academic structures still primarily support unidisciplinarity through hiring processes and tenure time limits that do not easily accommodate lengthier TD research endeavors. Challenges remain regarding the ability to publish TD research in many

well-established journals through peer-review processes that tend to emphasize and maintain disciplinary boundaries (also see Chapter 2).

Academic institutions play an integral role in the continued growth of TD health research. This role must involve the re-structuring of hiring and promotion processes and policies to more effectively support TD research efforts, the development of new journals and publication opportunities that support the review and dissemination of TD health research findings, greater consideration of spatial and technological infrastructures that promote collaboration, in combination with a continued investment in training with which to equip TD researchers of the future (see Chapters 2, 9, and 10).

Need for increased TD research funding: In Chapter 11, Johnson and Hrynkow noted an increased amount of funding in the last decade dedicated toward training and supporting TD health researchers, yet the number of competitions dedicated to the funding of new research team projects needs to continue to grow in order to increase awareness of TD health research and its potential for developing solutions to complex health problems. Funding agencies need to allow for greater cross-disciplinary representation on review committees and incorporate into new competitions the funding capacity to support technological and spatial resources that facilitate cross-sectoral collaboration between stakeholders. Furthermore, funding agencies should also consider revising their policies for funding administration and allow for stakeholder agencies within the community to hold funds in order to promote more equitable collaborative processes within TD research teams and capacity building for health interventions in the community.

Improving collaborations across diverse disciplines: In order to make TD health research truly actionable, multiple disciplines and perspectives must be involved in the research process. Greater attention needs to be paid to the inclusion of a diverse array of stakeholders and equitable collaborative processes. The case studies in this book represent excellent examples of cross-sectoral partnerships among academics, policy-makers, and community members. For example, the Refugee Well-Being project and the Street Health Report project involved capacity-building at the community level through opportunities for employment and learning for community members and stakeholders (e.g., learning and cultural exchange opportunities for refugee families and undergraduates in the Refugee Well-Being project (see Chapter 4) and training and employment for peer researchers with lived experience of homelessness in the Street Health project (see Chapter 5)). Furthermore, the project addressing child injury in Corkerhill, Scotland (see Chapter 6), was highly participatory in the sense that the project was developed in response to a community-identified problem and incorporated community members as key stakeholders throughout the project. As discussed in Chapter 3, community engagement and participation of community members with lived experience in all stages of the TD research process is important for increased understanding of complex health problems that affect socio-economically marginalized populations.

Several chapters have highlighted the necessity of important tools and techniques for working collaboratively with diverse stakeholders in light of different experiences and the potential for diverging research agendas. These include the drafting of

Terms of Reference that outline equitable decision-making procedures with which to establish respectful relationships among all partners. Reflexivity on the part of team members and trust-building activities are important components of balancing power and facilitating equitable involvement in the research by all team members. Techniques also include regular meetings and information sharing procedures with which to ensure stakeholder awareness of project developments and opportunities for team members to provide input throughout the life of the project.

Improving dissemination and knowledge exchange: In addition to the tools noted above, a commitment must be made to ongoing knowledge translation efforts in TD research projects, and dissemination activities should be built into study design. These efforts must include the development of non-academic, accessible products that are useful to a wide range of stakeholders and presentations on research findings to a broad range of audiences. Academics should also be willing to advocate within their academic structures and funding bodies to financially support community involvement, as community-based researchers and marginalized populations cannot access these resources without academic support.

Concluding Remarks

Through its bridging of different disciplines and perspectives, mixing of methods, and alignment with principles of community-based participatory research, TD urban health research is an emerging area that holds great promise for advancing knowledge, interventions, and, ultimately, solutions to complex urban health problems. This volume highlights this promise and promotes TD health research further by showcasing the work of leading health researchers who are using this approach, and through practical discussions of methodological benefits and challenges. We hope that an outcome of this collection will be a wider-reaching dialogue that includes academics, community members, and policy-makers and the increased development of cross-sectoral partnerships that will embrace this problem-solving research approach to health problems. We look forward to these advances with great anticipation.

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Subject Index

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