

POLICY NETWORKS, EVIDENCE AND INNOVATION IN BURKINA FASO

SOCIAL NETWORKS, RESEARCH EVIDENCE, AND INNOVATION IN
HEALTH POLICYMAKING IN BURKINA FASO

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LIST OF ABBREVIATIONS

3I	Institutions, Interests, Ideas
ACT	Artemisinin-based combination therapy
AE	Attribute effects models
AIDS	Acquired immunodeficiency syndrome
ARV	Antiretroviral therapy
CHW	Community health worker
CMLS- Sante	Comité ministériel de lutte contre le SIDA
CNLS- IST	Conseil national de lutte contre le SIDA et les infections sexuellement transmissibles [National AIDS Council]
CSO	Civil society organization
ERGM	Exponential random graph model
GWESP	Geometrically weighted edgewise shared partner
HIV	Human immunodeficiency virus
iCCM	Integrated community case management
IDRC	International Development Research Centre
IMCI	Integrated management of childhood illness
IO	International organization
KT	Knowledge translation
MoH	Ministry of Health
NGO	Non-government organization
SE	Structural effects models
SNA	Social network analysis
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

DECLARATION OF ACADEMIC ACHIEVEMENT

I, Jessica Shearer, declare that I conceptualized, designed, and implemented the research project described in this thesis with some guidance and input from my thesis committee who provided comments on the thesis proposal, study protocols and research instruments. I alone was responsible for data analysis and preparing the written chapters. My committee members provided feedback on earlier drafts of this thesis.

Chapter 1: Introduction

This chapter introduces the Ph.D. dissertation which follows, including three original research chapters based on empirical data collected in Burkina Faso. This chapter begins with an overview of social network analysis and the related body of theory that informed my approach, and presents a justification for its use in health policy analysis in a low-income country. I also introduce the substantive theme of research evidence exchange and use in health policy-making, building a case for its study using a network lens. This chapter then presents the overarching aims of this dissertation and summarizes the approaches for each research chapter that follows.

Social network analysis (SNA) is the study of social networks – the constellations of actors and their relationships that form a larger social structure. As a theoretical paradigm, SNA posits that social structures and dyadic ties are significant predictors of behaviours at individual and group levels. As a methodological approach, SNA takes information on actors, their dyadic relations, and their larger network structure to make meaningful conclusions about relevant outcomes. SNA encompasses multiple approaches to data collection, measurement and analysis, many of which will be explored in this thesis.

Social networks of policy actors have been described using various nomenclature, including advocacy coalitions (Sabatier, Weible 2007), epistemic communities (Haas 1992), global and transnational policy networks (Slaughter

1997, Walt, Lush & Ogden 2004, Stone 2008), advocacy networks (Keck, Sikkink 1998), issue networks (Heclo 1974), policy communities (Wright 1988, Coleman, Skogstad 1990), and policy networks (Atkinson, Coleman 1992). This thesis uses ‘policy networks’ to describe the actors in a policy community who have a relatively high level of interest in the policy issue and interact regularly.

SNA grew from the field of sociology and was used first to explain the diffusion of innovations (Rogers 2003). Contemporary analyses focus on everything from anti-terrorism networks (Raab, Milward 2003) to zebra social systems (Sundaresan et al. 2007). SNA’s applications to health systems and policy research and practice – both potential and realized – are numerous. For example, at the node (actor) level, early SNA described how networks affected the diffusion and adoption of guidelines among health professionals (Coleman, Katz & Menzel 1957). At the network level, analyses have explored how the structure of networks affects the governance of a health system (Provan, Milward 1995, Blanchet, James 2013). Most SNA studies in health systems and policy research have relied on describing networks; few have been extended to the explanation or prediction of individual-, dyad-, or network-level outcomes.

This thesis aims to address a series of gaps in the existing literature, specifically related to: (1) the quantity of social network analyses in policy sciences; (2) the theoretical groundedness of social network analyses in policy sciences; (3) the geographic foci of existing analyses; and (4) the substantive foci of existing analyses.

First, there is simply a dearth of applications of SNA to the study of policy-making, particularly at national decision-making levels and involving explanatory study designs. Recent years have seen a growth in the use of SNA for policy and political sciences, responding to a renewed interest in actor-oriented theories and approaches – a ‘relational turn’ – in those disciplines (McClurg, Young 2011, Lubell et al. 2012), but overall the history of SNA in policy sciences has been shorter than in other disciplines despite its applicability to the world of policy-making (Thatcher 1998). SNA in policy science has been slowed by the intensive data collection procedures required to map networks as well as the need to first develop a consistent theoretical framework (discussed below). Early SNA/policy research focused on describing networks of policy-makers (Raab 1992, Marsh, Smith 2000, Howlett 2002) and more recent efforts have attempted to link network characteristics to policy process outputs and outcomes (Sandstrom, Carlsson 2008, Wonodi et al. 2012) but the majority of these analyses have been limited to policy domains at sub-national or organizational levels. Few attempts have been made to collect data on national-level policy-makers’ networks, likely because of the difficulties involved in gaining access to those populations. This thesis addresses this gap by using SNA to study national health policy networks and their outcomes, which will improve the generalizability, as well as overall usefulness, of SNA of policy-making.

Calls for better engagement of SNA with existing political and policy science theories deserve attention (McClurg, Young 2011, Lubell et al. 2012), and will again improve the generalizability, as well as overall quality and credibility

of this field of study. The applicability of SNA concepts and tools to policy sciences should be apparent to the reader familiar with policy-making. Policy-making is a highly interpersonal endeavour where bargaining and the pursuit of collective action are constrained by the larger social environment. SNA has occupied various roles in relation to other theories of policy processes and policy change – some researchers have suggested that networks are merely the metaphorical descriptions of other concepts (Dowding 1995), such as institution or interest-based theories, while others have argued that networks are an explanatory variable themselves (Marsh, Smith 2000, Howlett 2002, Sandstrom, Carlsson 2008). This thesis begins to address the marriage of network concepts with existing institution, interest and ideas-based theories of policy change.

There have been very few SNA studies of health policy-making in low-income countries, despite the obvious suitability of the methods to the research subject. Low-income country policy-making has been characterised by its involvement of actors from various levels and sectors of society (Woelk et al. 2009), by frequent changes in rules and procedures governing the process, by the role of interpersonal relationships in determining policy outcomes (Hyden 2006), and by the relative power supra-national resources and normative guidelines (Weyland 2005). As a paradigm, SNA acknowledges the role of these dynamic and relational characteristics in determining group-level outcomes. As a measurement tool, SNA can capture, describe and analyse these processes. Rigorous policy research backed by appropriate theoretical paradigms is lacking

in low- and middle-income countries (Gilson, Raphaely 2008) and this thesis contributes to filling that gap.

This thesis aims to understand the exchange and use of research evidence in policy networks, a critical substantive gap. The substantive focus of this thesis on the exchange and use of research evidence addresses its growing prominence in policy debates. Beginning with the 2004 *World Report on Knowledge for Better Health* (WHO 2004), international organizations, donors, policy-makers and researchers have been increasingly interested in the role that research evidence might play in improving policy processes and health outcomes in low-income countries. Those same actors are actively involved in creating and testing interventions that support the transfer and use of evidence in health policy-making and this thesis begins to argue the necessary role of a social network lens in these activities.

Whereas SNA has been applied to the transfer, diffusion, adoption and use of information and knowledge in organizational, social, and other networks (Hansen 2002, Borgatti 2003, Reagans R, McEvily B. 2003, Rogers 2003, Inkpen, Tsang 2005), it has not been applied widely to the study of those processes in policy-making. Again, SNA is a natural fit for questions related to the inherently social processes of evidence exchange and use (Greenhalgh 2004, Lomas 2007). An extensive systematic review of diffusion of innovations in health services stated: “knowledge depends for its circulation on interpersonal networks and will spread only if these social features are taken into account and barriers are overcome” (Greenhalgh 2004). Systematic reviews of factors that support the use of evidence

in policy-making have identified the important role of interpersonal relationships between evidence producers and evidence users (Lavis 2005). Despite the identified role of interpersonal relationships in evidence exchange and use, few studies have taken an explicit relational, or network lens, on those processes and their outcomes.

This thesis address the methodological and substantive gaps mentioned above through three original pieces of research drawing on a breadth of disciplinary approaches, including policy sciences, political science, organizational sciences, and statistical network analysis. This thesis is broadly interested with the role of research evidence and innovation in improving policy processes and policies themselves in low-income countries, with a larger lens on the role of policy networks in these processes. The **specific aims** of this thesis are:

1. To develop and test a conceptual framework for the integration of networks, institutions, interests and ideas as major variables explaining policy change; (Chapter 2)
2. To test the relationship between policy network structure and policy outputs (the use of evidence, and innovativeness) at the case level across three health policy cases; (Chapter 3)
3. To model the factors that influence the exchange of research evidence between actors in a network, and the effect of those exchanges on actor-level use of research evidence. (Chapter 4)

This project was conceptualized and implemented by the Ph.D. candidate (Jessica Shearer). Access to the Burkina Faso Ministry of Health was made possible through a research project involving the Ministry and Jessica’s thesis supervisor, John Lavis. Committee members commented on the draft proposal and research instruments, as well as this thesis and its earlier versions. Regular committee meetings ensured oversight from the supervisor and committee and conformity with research ethics requirements.

The three research chapters in this thesis all arose from a single, field-based research project leading to a set of interview and social network data. Fieldwork was completed by the doctoral candidate between May 2011 and March 2012. Interviews carried out with close to 80 policy actors in Burkina Faso provided rich qualitative narratives of the three policy processes and descriptions of study outcomes such as the exchange of research evidence, the use of evidence at both individual- and network-levels and overall policy innovativeness. Social network surveys completed during interviews contributed quantitative data on actors’ networks. Each chapter described below uses different components of these data, and different approaches to their analysis in order to answer the overall research aims. Research methods are elaborated on within individual chapters, but annexes of supporting information are found at the end of the thesis.

Annex 1	Qualitative interview question guide
Annex 2	Social network survey
Annex 3	Types of respondents interviewed
Annex 4	Ethical approval

Chapter 2 addresses the first aim, taking a macro view of policy networks and policy change by exploring the theoretical and empirical evidence of their relationships. This chapter responds to calls for greater integration of network approaches with existing theories of policy change (McClurg, Young 2011, Lubell et al. 2012) in an effort to understand how each of these variables interacts to shape policy-making. This chapter begins to address these questions by developing a conceptual framework integrating network concepts with institutions, interests, and ideas (the “3Is” (Palier, Surel 2005)). This framework proposes that networks mediate the emergence of each I: namely, that interests are embedded in actor nodes and can facilitate or block the formation of ties; that ideas are transferred along ties; and that the overall network structure reflects institutional rules, constraints and opportunities for behaviours and collective action. This conceptual framework is tested using interview data from policy actors across three health policy cases in Burkina Faso. The collection and analysis of interview data sought to provide a detailed understanding of each of the policy processes, including actors and their interests, the institutions and rules that provided opportunities or constraints during policy-making, and the ideas – specifically research evidence – that were exchanged and called upon to inform decision-making. Through these detailed accounts I attempt to parse out the individual influences of each of the variables on policy change in order to confirm or refute the conceptual framework. While network change is certainly linked to

policy change (Howlett 2002), one must not ignore the often concomitant or preceding changes in institutions, interests and ideas.

In addressing the second aim, **Chapter 3** moves the focus from macro- to meso-level variables. A core branch of policy network sciences has aimed to identify measurable characteristics of networks and how they are associated with policy-relevant outcomes (Thatcher 1998, Marsh, Smith 2000). Data on actors and their relationships were used to map the policy networks for each case and measure structural characteristics such as density, centralization, and heterogeneity. Those structural attributes were compared to two outcomes – the use of evidence during the policy process and the overall innovativeness of the decision – in order to make broad generalizations about the effect of network structure. Propositions comparing network structure to network function are based on the premise that social capital is embedded in networks, different network structures will offer different incentives or constraints to the realization of that capital, and thus different network structures will be associated with different policy outcomes (Provan, Milward 1995, Lin 1999, Borgatti 2003). This Chapter applies research designs implemented in high-income countries to a low-income country, and directly explores the outcome of ‘evidence use’ in relation to network structure.

Chapter 4 narrows the focus even further in beginning to answer the third aim related to the exchange and use of research evidence *between and by actors*. This chapter uses a two-step process to: (1) model the exchange of evidence between actors, controlling for actor- and network-level factors; and (2) model

whether exchange is associated with its use. While, network theory suggests that interpersonal exchanges are predicated not only on the characteristics of the two actors involved in the exchange, but on their larger social environment, this assertion has long eluded statistical analysis. Social network data, with its interdependent units of observation, cannot satisfy independence assumptions of traditional probabilistic statistical analysis. Chapter 4 applies a novel statistical approach to overcome this problem – exponential random graph models (ERGM) – enabling the modelling of *interdependence* between actors and the prediction of the existence of ties between them. This approach successfully predicts the individual-, dyad-, and network-level conditions that support the exchange of research evidence.

The chapters in this thesis make theoretical, substantive and methodological contributions to the fields of health policy and systems research, social network analysis and policy sciences. No less than a paradigm shift in how policy-making is theorized, measured and practised, these findings present a call to adopt a network lens. The conceptual framework developed in Chapter 2 begins to move towards an integrated and multi-causal theory of policy change. Its findings relating networks to institutions, interests, and ideas are broadly generalizable across policy issues, sectors, and contexts. In highlighting the role of networks alongside better-known variables, I encourage policy-makers and those who support them to seriously consider the effect of networks on policy change.

Partly hidden amongst the focus on policy networks lie rich substantive narratives exploring three cases of health policy change in Burkina Faso, presenting detailed descriptions of how policy processes unfolded and how policy decisions were made for the community-based treatment of child health and malaria and the removal of user fees for HIV drugs. These cases studies offer substantive gains in understanding health policy-making in a low-income country, and a clearer picture of how networks affect policy change in these contexts and how evidence is exchanged and used at both individual and network levels. These findings will be of practical relevance for the design and adaptation of knowledge translation interventions.

Methodological contributions are made through the applications of a novel statistical approach for measuring and predicting exchange relationships. Chapter 4 validates the use of exponential random graph models on evidence exchange ties in policy networks, demonstrating that their application is feasible and yields useful information. In the search for interventions to support knowledge translation and evidence-informed policy-making, the ERGM approach offers a toolkit for those who practice analysis *for* policy-making to ‘know their network’ and to tailor exchange strategies to most effectively leverage actor and network characteristics.

References

- Atkinson, M.M. & Coleman, W.D. 1992, "Policy Networks, Policy Communities and the Problems of Governance", *Governance*, vol. 5, no. 2, pp. 154-180.
- Blanchet, K. & James, P. 2013, "The role of social networks in the governance of health systems: the case of eye care systems in Ghana", *Health policy and planning*, vol. 28, no. 2, pp. 143-156.
- Borgatti, S.P. 2003, "A relational view of information seeking and learning in social networks", *Management science*, vol. 49, no. 4, pp. 432.
- Coleman, J., Katz, E. & Menzel, H. 1957, "The Diffusion of an Innovation Among Physicians", *Sociometry*, vol. 20, no. 4, pp. 253-270.
- Coleman, W.D. & Skogstad, G.D. 1990, "Policy communities and policy networks: a structural approach" in *Policy communities and public policy in Canada* Copp Clark Pittman, , pp. 14-33.
- Dowding, K. 1995, "Model or Metaphor? A critical review of the policy network approach", *Political Studies*, vol. 43, no. 1, pp. 136-158.
- Gilson, L. & Raphaely, N. 2008, "The terrain of health policy analysis in low and middle income countries: a review of published literature 1994-2007", *Health policy and planning*, vol. 23, no. 5, pp. 294-307.
- Greenhalgh, T. 2004, "Diffusion of innovations in service organizations: systematic review and recommendations", *The Milbank quarterly*, vol. 82, no. 4, pp. 581.
- Haas, P.M. 1992, "Introduction: Epistemic Communities and International Policy Coordination", *International Organization*, vol. 46, no. 1, Knowledge, Power, and International Policy Coordination, pp. 1-35.
- Hecl, H. 1974, *Modern social politics in Britain and Sweden; from relief to income maintenance*. Yale University Press, New Haven.
- Howlett, M. 2002, "Do Networks Matter? Linking Policy Network Structure to Policy Outcomes: Evidence from Four Canadian Policy Sectors 1990-2000", *Canadian Journal of Political Science/Revue canadienne de science politique*, vol. 35, no. 02, pp. 235.
- Hyden, G. 2006, *African politics in comparative perspective*, Cambridge University Press, Cambridge.
- Keck, M.E. & Sikkink, K. 1998, *Activists beyond borders : advocacy networks in international politics*, Cornell University Press, Ithaca, N.Y.
- Lavis, J. 2005, "Towards systematic reviews that inform health care management and policy-making", *Journal of Health Services Research Policy*, vol. 10, no. Supplement 1, pp. 35.
- Lin, N. 1999, "Building a network theory of social capital", *Connections*, vol. 22, no. 1, pp. 28-51.

PhD Thesis – Jessica Shearer; McMaster University – Health Policy

- Lomas, J. 2007, "The in-between world of knowledge brokering", *BMJ (Clinical research ed.)*, vol. 334, no. 7585, pp. 129-132.
- Lubell, M., Scholz, J., Berardo, R. & Robins, G. 2012, "Testing Policy Theory with Statistical Models of Networks", *Policy Studies Journal*, vol. 40, no. 3, pp. 351-374.
- Marsh, D. & Smith, M. 2000, "Understanding Policy Networks: towards a Dialectical Approach", *Political Studies*, vol. 48, no. 1, pp. 4-21.
- McClurg, S.D. & Young, J.K. 2011, "Political Networks", *PS: Political Science & Politics*, vol. 44, no. 1, pp. 39-43.
- Palier, B. & Surel, Y. 2005, "Les «trois I» et l'analyse de l'État en action", *Revue française de science politique*, vol. 55, no. 1, pp. 7-32.
- Provan, K.G. & Milward, H.B. 1995, "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems", *Administrative Science Quarterly*, vol. 40, no. 1, pp. 1-33.
- Raab, C.D. 1992, "Taking networks seriously: Education policy in Britain", *European Journal of Political Research*, vol. 21, no. 1-2, pp. 69-90.
- Raab, J. & Milward, H.B. 2003, "Dark Networks as Problems", *Journal of Public Administration Research and Theory*, vol. 13, no. 4, pp. 413-439.
- Rogers, E.M. 2003, *Diffusion of innovations*, 5th edn, Free Press, New York.
- Sabatier, P.A. & Weible, C. 2007, "The Advocacy Coalition Framework: Innovations and Clarifications" in *Theories of the policy process*, ed. P.A. Sabatier, 2nd edn, Westview Press, Boulder, Colorado.
- Sandstrom, A. & Carlsson, L. 2008, "The Performance of Policy Networks: The Relation between Network Structure and Network Performance", *Policy Studies Journal*, vol. 36, no. 4, pp. 497-524.
- Slaughter, A. 1997, "The Real New World Order", *Foreign Affairs*, vol. 76, no. 5, pp. 183-197.
- Stone, D. 2008, "Global Public Policy, Transnational Policy Communities, and Their Networks", *Policy Studies Journal*, vol. 36, no. 1, pp. 19-38.
- Sundaresan, S.R., Fischhoff, I.R., Dushoff, J. & Rubenstein, D.I. 2007, "Network metrics reveal differences in social organization between two fission–fusion species, Grevy's zebra and onager", *Oecologia*, vol. 151, no. 1, pp. 140-149.
- Thatcher, M. 1998, "The Development of Policy Network Analyses", *Journal of Theoretical Politics*, vol. 10, no. 4, pp. 389-416.
- Walt, G., Lush, L. & Ogden, J. 2004, "International Organizations in Transfer of Infectious Diseases: Iterative Loops of Adoption, Adaptation, and Marketing", *Governance*, vol. 17, no. 2, pp. 189-210.

PhD Thesis – Jessica Shearer; McMaster University – Health Policy

Weyland, K.G. 2005, "Theories of policy diffusion: lessons from Latin American pension reform", *World Politics*, vol. 57, no. 2, pp. 262.

WHO 2004, *World report on knowledge for better health*, World Health Organization, Geneva.

Woelk, G., Daniels, K., Cliff, J., Lewin, S., Sevene, E., Fernandes, B., Mariano, A., Matinhure, S., Oxman, A., Lavis, J. & Lundborg, C. 2009, "Translating research into policy: lessons learned from eclampsia treatment and malaria control in three southern African countries", *Health research policy and systems*, vol. 7, pp. 31-31.

Wonodi, C.B., Privor-Dumm, L., Aina, M., Pate, A.M., Reis, R., Gadhoke, P. & Levine, O.S. 2012, "Using social network analysis to examine the decision-making process on new vaccine introduction in Nigeria", *Health policy and planning*, vol. 27 Suppl 2, pp. ii27-38.

Wright, M. 1988, "Policy Community, Policy Network and Comparative Industrial Policies", *Political Studies*, vol. 36, no. 4, pp. 593-612.

Chapter 2: The interaction of policy networks with institutions, interests and ideas in three health policy cases in Burkina Faso

Abstract

Policy networks have become increasingly central in the analysis of policy change as part of the ‘relational turn’ in political science. Until recently, policy network theories have been considered separately from other established theories and frameworks of policy change. There has been a growing call for policy network analysis to be situated within existing theories of policy change and to explore the interdependence among those theories. This chapter explores the ways in which policy networks interact with or mediate the influence of other factors in policy change, including the role of institutions, interests and ideas, referred to as the “3Is”. We present theoretical propositions of these relationships and test them using data collected during interviews with policy actors in three health policy cases in Burkina Faso. Our findings suggest that while network change is indeed associated with policy change, this relationship is mediated by changes in one or more of institutions, interests and ideas. In this context of high donor dependency, donors introduced new institutional rules that affected the composition and structure of the policy networks. Similarly, donors influenced the composition and power of various interests in these networks, thus affecting the balance of power and the direction of policy change. The introduction of new ideas was critical in affecting policy changes across networks; ideas gained entry during endogenous shifts in network composition, but more often because of donor-led restructuring

of these networks through new institutional rules. In conclusion, policy networks interact with institutions, interests and ideas to affect policy change. Rarely do networks independently affect policy change without concomitant changes in other policy variables. Policy-makers and practitioners can use these results to inform their planning and analysis of policy-making processes, with an eye to the role of networks in addition to the better-known variables.

Introduction

Social network theory posits that decisions and behaviours of individuals or groups are the product of those actors' larger social environments. This premise is particularly relevant to the study of processes and systems that are inherently relational, including policy-making. Policy networks, which we consider to be the set of actors participating in a given policy issue at a given point in time, have been discussed variously as advocacy coalitions (Sabatier, Weible 2007), epistemic communities (Haas 1992), global and transnational policy networks (Slaughter 1997, Walt, Lush & Ogden 2004, Stone 2008), advocacy networks (Keck, Sikkink 1998), issue networks (Heclo 1974), policy communities (Wright 1988, Coleman, Skogstad 1990), and policy networks (Atkinson, Coleman 1992). Policy networks have been studied in the context of policy sciences and policy analysis in order to better understand how network characteristics might affect policy processes and outcomes. Policy networks have become increasingly important in the study of policy change as part of the 'relational turn' in political science (McClurg, Young 2011).

Policy network analysis has been used in high-income countries to explain policy change as the result of changes in network composition (i.e., a change in who makes up the network) and changes in structure (i.e., how actors are connected to others and how those connections create a global structure) (Marsh 1998, Howlett 2002, Sandstrom, Carlsson 2008). There have been no similar studies exploring the role of networks in policy-making in low-income countries despite the potential benefits of adopting a network lens in these settings; namely,

as a tool for capturing the informal nature of policy-making and the diverse sets of actors involved. In a study of health policy-making in southern African countries, Woelk et al. (2009) identified policy actors from government, civil society, development partners, donors, and the private sector, consistent with trends of shifts in policy authority away from the state (Mathews 1997). The informal nature of politics in Latin America, post-communist Eurasia, Africa and Asia has been documented (2004). Particularly in Africa, political scientists have explored the role of entrenched kinship networks on political decision-making (Hyden 2006). This chapter thus fills a gap in the literature in extending policy network analysis to a low-income country.

The second major motivation for this chapter addresses the historical inattention within policy network studies to competing or corroborating theories of policy change. Calls to better situate policy network analysis within existing theories of policy change (Lubell et al. 2012) and to explore the interdependence among those theories (McClurg, Young 2011) guide our conceptual framework. Thus, this chapter aims to better understand how theories of policy networks can be systematically integrated with existing theories of policy change – particularly theories of institutions, interests and ideas (the 3Is) (Palier, Surel 2005). We developed a conceptual framework to describe how each of the 3Is, as well as networks, might influence policy change and how they might mediate each other. We test this framework with empirical data from three national health policy cases in Burkina Faso.

A 3I+N conceptual framework of policy change

Our conceptual framework was dually informed by the literature discussing the role of institutions, interests and ideas in policy change, as well as the policy network literature. Figure 1 depicts a conceptual framework that synthesises these findings. The 3-I framework was used as the baseline framework of how institutions, interests and ideas contribute to policy change (Palier 2005) and we expect that large changes in these variables will lead to policy change. We also expect that network change, through its interactions with the 3-I framework will be associated with policy change. This study takes a qualitative approach to describing network change as any major shifts in the make-up of actors or how they are linked to each other.

Insert Figure 1 here

Institutions are the ‘rules of the game’ in policy-making (North 1990) and affect policy change by structuring policy-making in ways that favour some outcomes over others. New institutionalism and its three ‘schools’ – rational choice, historical and sociological – brought increased attention to the role of policy legacies (i.e., that policy trajectories are locked in by initial decisions that create incentives and learning among certain actor), path dependencies (i.e., that a policy’s path is difficult to alter), and social norms (i.e., that publics come to expect certain policy outputs) in structuring the likelihood of policy change (Hall, Taylor 1996). While a central premise of political institutionalism is the *rarity* of

policy change, the presence of change is explained primarily by external events that alter institutional rules enough to provide a window for public action. Institutions may be formal or informal, and indeed, the significant role of informal institutions has been highlighted in low-income countries (Helmke, Levitsky 2004, Hyden 2006, Bratton 2007).

How then do networks interact with institutions to affect policy change? As stated by Lubell (2012, p.355), “a change in institutional rules directly affects network structure by creating new opportunities and incentives for policy interactions.” Institutional rules dictating who participates in policy-making will affect network structure by specifying network actors and possibly even their ties to others. Networks can *create* institutions, according to sociological institutionalism, by facilitating interactions among actors (Hall, Taylor 1996). Networks, like institutions, have the ability to structure interactions and behaviours (Sandstrom, Carlsson 2008, Marsh, Smith 2000). We expect to observe associations between changes in institutions, networks, and policy.

Interests describe the intentions and stakes embedded in policy actors (see Figure 1). The ability of actors to exercise and attain their interests depends on the distribution of resources and power in a policy domain. Policy-making is a power struggle among competing interests. Specific to low- and middle-income settings, scholars describe a growing authority of private actors in government policy-making processes (Buse, Walt 2002) adding to the existing power of international organizations (Kahler, Lake 2004, Dobbin, Simmons & Garrett 2007) as well as trends towards decentralization (Litvack, Junaid & Bird 1998). The contestation

of power among this growing diversity of interests is largely driven by access to resources in these settings.

How then, might networks and interests interact to affect policy change? Networks provide a useful window into understanding how interests, embedded in nodes, are structured in the policy process and how network structure changes as actors form and dissolve relationships. Like institutions or ‘rules of the game’, networks can also influence the balance of power by choosing to include or exclude participants (Marsh, Smith 2000). Actors can strategically shape networks to advance their interests, by controlling who participates and how strategic relationships are formed or dissolved (Marsh, Smith 2000, Howlett 2002). We expect that changes in interests will alter network structure, which will in turn be associated with policy change.

The concept of ‘*ideas*’ in policy sciences is broad and includes analytic approaches such as cognitive and normative frames (Surel 2000), policy paradigms (Hall 1993), and ‘evidence-informed’ policy-making (Lavis et al. 2004). Surel (2000) argues that decision-makers’ cognitive and normative frames circumscribe available policy options. Discord over paradigms or ‘deep core beliefs’ may block any chance for change (Hall 1993, Sabatier, Weible 2007). Hall (1993) demonstrates that paradigms can shift with the identification of an anomaly in the existing paradigm or through a power structure that allows one set of actors to impose their paradigm on others.

The use of research evidence in policy has been described through a rational-technical lens as well as through a lens that considers the political value

of information, and particularly of research evidence (Weiss 1979, Radaelli 1999). Its importance as an area of research and practice has risen in low- and middle-income countries as decision-makers search for strategies to maximize health gains under severe resource constraints.

Networks play an important role in the creation, dissemination and reinforcement of ideas (Owen-Smith, Powell 2008). Figure 1 represents ideas being exchanged through network ties. The structure of those ties can reinforce or shift paradigms and values (Sabatier, Weible 2007), and control the entrance of new ideas. Networks have been studied extensively in the field of knowledge transfer and it is clear that network structure affects the rate and reach of information dissemination (Reagans, McEvily 2003). Conversely, clustering of actors around certain ideas may influence network shape, thus influencing policy change, and the entrance of new ideas may be highly disruptive to networks. Yet, despite the extensive body of literature on knowledge transfer networks, particularly in the context of organizational change, there has been little written about how policy networks shape the transfer and use of information in policy processes. We expect that substantial changes in ideas will be associated with changes in network structure.

Thus, Figure 1 illustrates our hypothesis that networks are inherently intertwined with the 3Is; specifically, that institutions provide the scaffolding, including opportunities and constraints, for network structure, interests are embedded in actor nodes and ideas are exchanged along ties between actors. Thus, changes in the 3Is are also intertwined with network change, and these

changes, in turn, shape policy processes that lead to policy change. Next, we describe three cases of policy change in order to test these propositions.

Methods

Study setting

This study took place in Burkina Faso, which is ranked 183 of 187 countries on the United Nations human development index (Ministère de la santé 2011, United Nations Development Programme 2013). The under-five mortality rate is 176 deaths per 1000 live births, the third highest in the world, with correct treatment administered to only 42%, 28% and 41% of cases of childhood diarrheal, pneumonia, and malaria, respectively (Countdown to 2015. 2012). Human immunodeficiency virus (HIV) prevalence is 1.2% and 50% of patients receive treatment (CNLS-IST 2010b).

Burkina Faso is a semi-presidential republic (i.e., a popularly elected president alongside a prime minister and Cabinet responsible to the legislature (Elgie 2007)) with most health policy decisions made by the national ministry of health. Implementation of health policies is decentralized to district-level health teams and increasingly to contracted civil society agents. The national government contributed 35% to total health spending in 2009 versus 37% from private/household sources and 26% from external donors (Ministère de la santé 2011). Burkina Faso was chosen as a study country because of the lead researcher's joint participation with policy-makers on a separate project – "Evaluating Knowledge-Translation Platforms in Low- and Middle-Income

Countries” (Program in Policy Decision-making 2013) – and thus access to policy networks. Burkina Faso is similar in many regards to other West African and African countries in terms of level of development, political regime type, dependency on foreign aid and policy-making that is characterised by diverse actors and frequent changes in institutions. Results from this study should be applicable to other countries in the region.

Policy cases

Following Gerring (2004), we define a case study as “an intensive study of a single unit for the purpose of understanding a larger class of (similar) units,” where the ‘unit’ is Burkina Faso and the embedded cases are policy processes/cases, defined as series of events leading to a government statement of intent to act on a policy issue, and for which there are clear plans to implement their decision. This definition was created in order to capture the historical processes leading up to government decisions and to orient interview respondents to a specific outcome of those processes. Cases were selected in part for pragmatic considerations, including the public availability of relevant documents on the cases and their projected network sizes adequate to enable statistical analyses. Cases were also selected according to their ‘diversity’ on independent variables of interest, namely network structure, in order to explore and confirm theoretical propositions about the factors that lead to policy change (Seawright, Gerring 2008). Three policy cases were thus chosen: “Community Integrated Management of Childhood Illness,” a child-health programme which trains

community health workers (CHW) to diagnose and treat malaria, pneumonia, diarrhoea and malnutrition in the community; “home management of malaria,” a malaria programme which uses CHWs to diagnose and treat uncomplicated malaria in the community using artemisinin-based combination therapies (ACT); and the removal of user fees for antiretroviral treatment for HIV. These cases will be hereto referred to by their substantive themes: ‘child health’; ‘malaria’; and ‘HIV’. Case backgrounds are described in Table 1

Data collection and analysis

Data were collected through document review and interviews during the period May 2011-March 2012, in Ouagadougou, Burkina Faso. The primary researcher searched for documents pertaining to each of the cases in the following libraries, databases and websites: Burkina Faso Ministry of Health website; Department of Family Health library; Department of Studies and Planning library; National AIDS Council (CNLS-IST) library; UNICEF Burkina library; WHO Burkina library; Google; PubMed; www.lefaso.net (newspaper); and www.lepays.com (newspaper). Searches were performed in French and English, depending on the database, and included international and regional documents that pertained to Burkina Faso as well as national documents ranging from published research evidence, reports, policy documents, news media, and meeting minutes and presentations.

Interview data were collected during in-depth semi-structured interviews. Most interviews took place in Ouagadougou and some occurred on the telephone

or in-person in other locales. Initial respondents were identified through the document review and by input from colleagues in the Ministry of Health. Additional respondents were identified using respondent-driven sampling methods. Additional interviews were sought with actors who were not directly involved in the process, but who perhaps should have been, or who had an important perspective or stake in the issue. For the purposes of the linked social network analysis studies (see Chapters 3&4), the researcher aimed to identify and interview all actors in each policy case. Theoretical saturation was met prior to interviewing all actors, in that no new information was arising from new interviews.

Interviews were semi-structured and based on a pre-established question guide which was pilot tested before finalizing. Interviews lasted on average for 45 minutes, were conducted in French, audio-recorded and notes were taken. Recordings were transcribed in French. The French transcriptions were read and codes applied in English according to a pre-established codebook based on the 3I theoretical framework with additional codes related to network structure and network change. The codebook was tested using a sample of data before finalizing. Cases were analyzed for within- and across-case variation, as well as for variation over time (Gerring 2004).

Efforts were made during analysis to identify emergent themes as well as negative data. NVivo 10 software was used to manage and code interview data (QSR International 2012).

Ethical approval was received from the McMaster University Faculty of Health Sciences Research Ethics Board and the Burkina Faso Ministry of Health's National Health Research Ethics Council (Council National d'Ethique de la recherche en santé). Signed consent was requested from respondents prior to beginning interviews.

Results

Table 1 describes the background and context for each case and Figure 2 depicts a timeline of events across the cases. The following section will explore the development of each of the three policies, with a focus on the role of institutions, interests and ideas in shaping policy change. Table 2 summarizes the role of each of the 3Is in policy change.

Insert Table 1 here

Insert Figure 2 here

Community management of childhood illness

The development of Burkina Faso's present community-based treatment policy for childhood illnesses was informed by the interaction of institutions, interests and ideas. Historical legacies of CHW programs, an institutions variable, created a supportive environment for a community-based strategy but hindered its scope due to the limited capacity of existing CHWs to deliver such an

intervention. Evidence surrounding the failure of the facility-based paradigm, an ideas variable, placed community management on the policy agenda. A well-timed funding opportunity, an external event, and the inclusion of supportive partners in the policy networks, an interest variable, opened a window for a community management programme. The final decision to include pneumonia as part of the package was influenced partly by a policy champion's exposure to other countries' experiences (ideas), but also by a mandate from programme funders (institutions).

Community health policy in Burkina Faso originated in 1985 when president Thomas Sankara announced his vision for “one village, one primary health post” (Seck, Valea 2011) leading to the selection and training of lay community health workers chosen by their communities. While this policy was essentially abandoned after the president's death in a 1987 coup, it created a cadre of CHWs who were later used by other government and non-government programmes. The existence of these CHWs led rural communities to expect them, termed “lock-in effects” in the political science literature (Pierson 1993), and policy learning amongst policy-makers. CHWs played an ongoing role in the delivery of health programmes during the 1990s and 2000s despite a policy shift towards vertical disease programmes and facility-based care.

In the late 1990s, the World Health Organization (WHO) developed the Integrated Management of Childhood Illness (IMCI) approach in an attempt to improve the identification and management of childhood illnesses. Burkina Faso adopted an IMCI policy in 1999, training facility-based health workers to

correctly identify and treat childhood malaria, pneumonia, and diarrhoea (Direction de la santé de la famille 2005) . Although a component of IMCI intended to train community workers to provide education and referral activities, it was never fully developed or implemented. Instead, IMCI reinforced the dominant facility-based paradigm and the administrative capacities of the health system to plan and deliver clinical care. Nurses benefitted from assured salaries and viewed their new roles as entrenched in the health system; they later opposed community-based approaches for fear of losing power. The office created to manage IMCI in the Division of Family Health, staffed by former clinicians, further entrenched the facility-based paradigm to the detriment of a community-based paradigm. Funding and technical assistance from WHO, whose paradigm was also very profession-based, reinforced a small but dense network of policy elites who shared this paradigm.

Consistent with Hall (1993), the paradigm shifted toward community approaches only following observed weaknesses in the facility-based paradigm. A mid-term evaluation of the country's national health plan showed slow progress towards the child health Millennium Development Goal, which carried significant political weight. It was believed, based on survey data (UNICEF, INSD 2006) and tacit knowledge, that those children who continued to die in large numbers did so at home. Despite the scope of resources allocated to IMCI, the same evaluation pointed to poor programme coverage and low utilization even where services were available (Ministère de la santé 2007). There was a growing agreement in the health bureaucracy around the need to address issues of coverage

and access, and thus community-based management of childhood illnesses emerged as a policy option.

Elsewhere, governments were experimenting with the community-level treatment of major childhood illnesses by CHWs, including the treatment of pneumonia with antibiotics. A 2005 visit by a project team from Senegal attempted to persuade the government that integrated community case management was feasible and effective, but respondents reported policy elites were uninterested and “not ready.” Policy-makers pointed to the advanced age and high levels of illiteracy of CHWs as reasons for why such a policy might have harmful consequences in Burkina Faso, particularly around the community use of antibiotics. Over time, more country experiences diffused into Burkina Faso’s child health policy community via actors’ participation in regional meetings, conferences and site visits. UNICEF, particularly, provided financial and technical support that facilitated exposure to and dissemination of other countries’ experiences.

By 2008, the government had agreed to pilot community treatment of malaria, diarrhoea, and malnutrition in eleven districts with the support of UNICEF. While positive local experiences were accumulating for community case management of malaria, diarrhoea and malnutrition, pneumonia was completely off the governmental agenda. The country’s overarching health law forbade the use of antibiotics by lay persons (Burkina Faso 1994). The existence of this law, the dominant facility-based paradigm, and the profile of the CHW

cadre dating from 1985, made many decision-makers and health workers opposed to the treatment of pneumonia by CHWs.

A policy window for community-based management of childhood illnesses, including pneumonia, opened in 2008. The Partnership for Maternal, Newborn and Child Health (the Partnership), a WHO-based global health partnership, along with the Bill and Melinda Gates Foundation (Gates Foundation), presented the Government of Burkina Faso with the opportunity to apply for US\$6 million in funding over three years to accelerate progress towards the child health Millennium Development Goal. This circumscription of child health influenced Burkina to move forward with its consideration of community approaches despite the desire of the Division of Family Health to address their priorities surrounding maternal health and the continuum of care. Funding rules further constrained options by requiring that the proposed interventions must reduce under-five mortality by 25% during the project period; it was later determined by researchers hired by the funders that a community-based package including pneumonia, diarrhoea and malaria management; insecticide treated nets; and Vitamin A supplementation would meet this goal (Bryce et al. 2010). Finally, the donor rules opened the policy network to new actors in mandating the co-leadership of the proposal process by UNICEF and the Division of Family Health, as well as the full participation of other multilateral agencies, the participation of evaluation teams from a local research institution and an American school of public health, and finally, input from the funders.

The funding proposal is significant in that its development provided the groundwork for a government policy document on community management of childhood illnesses (Direction de la santé de la famille 2010) . While the overall policy network was relatively large and diverse, the bulk of the work was performed by a core group of Division of Family Health technical staff with UNICEF support. Respondents noted that some actors in this core group initially opposed the inclusion of pneumonia, in line with the existing facility-based paradigm in their department. This became the most contentious debate during the process, despite efforts by UNICEF to overcome opposition using persuasion and the dissemination of research evidence from other countries. To this end, numerous respondents cited the importance of UNICEF’s dissemination of the 2003 Lancet series on child survival during meetings (Black, Morris & Bryce 2003). Respondents cited the study as strong evidence for community management of childhood illnesses; peculiarly, the series did not actually mention the effectiveness of community-based approaches (Bryce et al. 2003). It is not clear to what extent UNICEF used the publication strategically to support their pre-determined policy position but it certainly attained a symbolic status during the policy development process.

Nevertheless, the original proposal submission to the funders did not include the community management of pneumonia. The funders exercised their veto power in their comments on the submission, stating: “Community IMCI must focus on the community management of pneumonia” (Direction de la santé de la famille 2008) . Around this time, in what many respondents considered to be one

of the most important events for community case management in Burkina Faso, UNICEF supported a government health official to attend a 2008 meeting in Madagascar, where 20 countries shared community-case management experiences. Burkina's attendee was convinced by what he saw and returned to share his experiences with colleagues in support of fully integrated community management, including pneumonia, in the funding proposal.

Yes, me for example, I presented, every time I presented the experiences I had seen in Madagascar. With... the experiences of Senegal, of Malawi, of Rwanda... All those countries. In any case I made these presentations and that helped people, to convince people that if we do it with agents well motivated, of a certain level, it can help manage, to decrease mortality.
(Government official)

The government's next submission included a pneumonia management pilot in two health districts. The existing drug prescribing laws were bypassed by the introduction of a Ministry of Health strategic plan for community management of childhood illnesses (Direction de la santé de la famille 2010).

Evolution and dynamics of the child health network

The original policy network was comprised of a small set of child health technical staff in the Ministry of Health, as well as occasional intervention from higher-level policy elites and development partners. The network existed largely thanks to policy legacies, including policy learning and organizational niches, created by past child health policies. The original network shared a common paradigm; specifically, that child mortality was best addressed in facilities by

trained health workers. The network's cohesion and its shared paradigm were mutually reinforcing; its institutional context allowed it to remain largely closed to new actors or ideas thus limiting prospects for policy change. When the external funder changed the rules of the game by mandating the participation of development partners and researchers, the entry of these actors changed the structure of the network. UNICEF and WHO's active dissemination of evidence and other countries' experiences forged new ties in this network. The gradual shift in paradigm encouraged the weakening of some ties and strengthening of others, as supportive actors distanced themselves from opposing ones, thus shifting the balance of power. Exposure to a larger supra-national network was particularly important in this case. A change in the information capital of one network actor, as was the case of the health bureaucrat who attended the regional meeting on community case management, was able to change his network position and thus the overall network structure, facilitating policy change.

Insert Figure 3a here

Home management of malaria

Home management of malaria has a long history in Burkina Faso. The present policy was partly shaped by legacies of an earlier policy, and institutional variable, as well as supportive research evidence, an ideas variable. As in the child health case, funders opened a policy window, an external event, but simultaneously changed the rules of the game. A new institutional rule, in the form of a loan condition to involve civil society actors changed the composition

of interests in the malaria policy network and thus network shape. The new network made the national home management program feasible.

Home management of malaria was first introduced in Burkina Faso in 1997, using existing CHWs to dispense chloroquine and paracetamol for fever. Although this programme faced difficulties in scaling-up due to lack of funding (Programme national de lutte contre le paludisme 2004), it was generally perceived to be successful in extending malaria treatment access in implementing health districts (Kouyate et al. 2007). The original programme created a number of policy legacies that favoured its reinstatement in later years. As with other community-based programmes, it created administrative capacities within the health bureaucracy, and specifically the National Malaria Control Programme. Positive experiences with the original programme caused many health bureaucrats to support its future iterations (GOV_931). The initial reliance on community health workers, who remained central to the programme, further cemented their role in the community, thus strengthening population lock-in effects.

Home management of malaria was an important component of the country's overall malaria strategy and was supported and encouraged by WHO, Roll Back Malaria, and other development partners. It also existed within a supportive research environment where studies frequently demonstrated its effectiveness, feasibility and acceptability (Pagnoni et al. 1997, Sirima et al. 2003, Kouyate et al. 2007, Tiono et al. 2008), generating policy learning among government elites. All of these factors reinforced a political economy of malaria

research and external aid for malaria programs, favouring the expansion of the home management programme.

Despite optimism surrounding home management of malaria, the original programme was cancelled in 2005 based on evidence of chloroquine resistance and new global guidelines for the use of ACTs as a first-line therapy for uncomplicated malaria (Programme national de lutte contre le paludisme 2006). Concerns over ACT cost and supply kept home management of malaria off the policy agenda for a number of years (Tipke et al. 2009). The emergence of chloroquine resistance created fears among policy-makers that the same thing could happen to ACTs if they were mismanaged by CHWs; yet, informal drug use was becoming a growing problem. Patients, who had come to expect treatment through the original home management programme, sought chloroquine for self-treatment of malaria through private pharmacies and counterfeit drug vendors (Tipke et al. 2009, Ouedraogo et al. 2008). The ongoing use of an ineffective drug posed a public health and policy problem (Kouyate, Nana 2010).

Even if we refuse the treatment in the community the people will do it. Because they are going to buy products and medicines from the street or elsewhere. Better to formalize this community treatment than leave people to their choice of drug, which at this time was very dangerous.
(International organization)

As with the child health case, external funders opened a policy window. Around 2006, home management of malaria became a strategic focus of the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). The government decided to apply in 2007 for funding to pilot home management with ACTs in two districts. This decision was informed by the growing body of studies from

Burkina Faso showing the feasibility and effectiveness of CHWs to use ACTs in communities (Tiono et al. 2008, Sirima et al. 2009), which were widely exchanged within the small, technical malaria policy network. The application for pilot funding was accepted, but never fully implemented. Burkina Faso learned in 2008 that the Global Fund was willing to make enough funding available to scale-up the programme nation-wide through that years' funding stream. In light of this, and ongoing advocacy from partners, the country decided to move ahead with a new application.

The 2008 funding round was unique in that it was the first year that the Global Fund mandated the nearly equal participation of civil society as co-recipients of the grant. Nearly all respondents remarked that without this condition, civil society would not have been implicated to the extent that they were.

When they sent us the directions for Round 8, they encouraged us to involve the community sector and that would count as a 'plus' in the proposal, it's true. If it had not been said like that, maybe the community sector would not have been involved at this level... (Non-government organization)

Decisions that had once been made by the relatively small but powerful National Malaria Control Programme were now party to influence from a much larger network of actors. Civil society beneficiaries were selected and participated actively subsequently, becoming a powerful voice in the process. Respondents reported some disagreements between government and civil society actors, with each party attempting to retain control over programme activities and thus financial spoils. Unlike in the child health case, disagreements over deep core

beliefs were rare; rather, government and civil society actors tended to differ on *how* the programme should be implemented. In any case, the expanded network of actors was necessary for successful nationwide implementation. Most respondents agreed that civil society actors would remain involved in home management of malaria now that the public sector had lost its advantage both in terms of community-level capacity and in access to resources.

Research evidence took a back seat during the Round 8 process. The opening of the network to civil society actors, who had less of a technical focus than their government counterparts, reduced the exchange of research evidence; overall, few civil society respondents reported awareness of existing studies on home management of malaria. As well, the incentive to use research evidence to directly inform policy (i.e., the results of the pilot project) was reduced upon the offer of funding through Round 8. The sole use of research evidence appeared to be by external consultants who were hired to write the final proposal, as the funders required it include a certain amount of data and evidence.

Evolution and dynamics of the malaria network

The original malaria treatment network was centered around technical staff in the National Malaria Control Program. These actors shared a common paradigm, which was highly informed by linkages with local malaria research institutions and a history of experience related to home management. As with the child health network, the combination of a shared paradigm and dense network were mutually reinforcing and created disincentives for seeking new actors. The

donor's institutional rule to include civil society opened the policy network to new actors, shifting the balance of power in the network. The composition of the new network made possible the adoption of a national home management programme.

Insert Figure 3b here

Removal of user fees for HIV treatment

The story of the removal of user fees for antiretroviral treatment is one which weaves together perceived failures of formal policies and the informal policies created to overcome those failures. Earlier government policy, an institutions variable, had created a network of powerful civil society actors (interests) who, over time, diffused their informal institutional rules through the HIV policy network. The government was eventually forced to reconcile its official position with the on-the-ground reality which was captured by a research study (ideas). Despite years of government opposition to user-fee removal, the status quo had become such that it was no longer politically expedient or practically efficient to charge user fees.

User fees can be traced to the Bamako Initiative, a WHO/UNICEF initiative to improve access to primary health care through decentralization and cost-recovery (Ridde 2003). Ratified in 1987 and launched in 1992 in Burkina Faso (Seck, Valea 2011), the Bamako Initiative has left a legacy of user fees across Africa and has had particularly strong effects in West Africa. Indeed, the

normative effects of the Bamako Initiative may have posed the most significant barrier to user fee removal. Its legacy was apparent in national policy documents which presented the Bamako Initiative as an overarching orientation for the health system (Government of Burkina Faso. 2000, Government of Burkina Faso. 2007, Government of Burkina Faso 2011). Interviews with government elites demonstrated their support for the Bamako Initiative and associated ideologies of individual responsibility. Thus, many of these elites, including the Minister of Health prior to 2008, were opposed to the removal of user fees. In the HIV/AIDS decision-making structure, the Minister of Health held veto power, as did high-level government staff in the National AIDS Council, and finally, the President of Burkina Faso. Thus, until a change in ministers in 2008, technical arguments from the Ministry of Health could not progress up the decision-making chain.

I know that with the coordinator of [Ministry of Health HIV/AIDS office], we had prepared during this time a document to explain why we were able to move towards gratuité [free care] but the political authority had other motivations than the advice of technicians. (Government official)

While the government, and particularly the elites within the government, were convinced of the value of user fees, civil society actors were strongly opposed, driven by an ideology of social justice and universal access to treatment. Civil society groups representing people living with HIV played an essential role in the user fee debate in Burkina Faso, first originating as a grassroots response to problems of access to treatment (Peschi 2004). When treatment became available in Burkina Faso in 2000, these groups became active in service provision in order

to fill the void left by the ineffective government response. Recognizing its own limitations, the government allowed and encouraged these developments, resulting in a network of non-governmental treatment providers with a growing organizational niche. As the treatment agenda grew, civil society began to advocate for the removal of user fees.

In 2003, non-government and civil society groups formed a coalition with the explicit purpose of advocating for the removal of antiretroviral treatment user fees. Respondents described this coalition as well-organized, sharing a common vision, and highly active in policy discussions. This power of the coalition was reinforced by the rules of the National AIDS Council, giving them a seat in national policy debates and access to the President. Civil society actors benefited from dense national networks, as well as connections to regional and international actors, and thus information. Their cohesiveness increased during 2008 when they were required to participate in the HIV/AIDS funding application to the Global Fund.

Pretty much all the civil society leaders, we were in collaboration during this period of the issue. (Civil society organization)

The way in which civil society actors had networked themselves reinforced their power in the debate. As a unified voice with strong connections throughout the country, at all levels of advocacy and service delivery, their network strengthened and legitimated their treatment paradigm. Meanwhile, confronted with patients who could not afford treatment, but who were not poor enough to be considered indigent, service providers began ignoring the official user fee policy. The extent

of this practice was measured in 2006, demonstrating that 79% of patients attending HIV clinics did not pay for antiretroviral treatment received (Kouanda et al. 2010). Ultimately, most respondents agreed that the growing evidence on the failure of cost recovery had acted to break down the dominant paradigm supporting user fees.

A change in the minister of health in 2008 opened a window for a wider debate on user fees. This initiated the technical work necessary for the decision, including an important technical note prepared by the HIV/AIDS office in the Ministry of Health which demonstrated that at most, 2% of total costs could be recovered in the current system (CMLS-Santé 2009). Growing availability of data to demonstrate the failure of the policy forced the government to re-consider its position.

Also in 2008, the government introduced a new social safety net account (“filets sociaux”) in response to the 2008 global economic crisis, allowing new government and donor funding to target specific programmes or social needs (World Bank 2011). This opportunity may have satisfied normative constraints more than operational ones, as financial analyses had shown that cost-recovery was playing a very limited role, if any, in financing antiretroviral treatment. However, the funds did assuage decision-makers’ fears that they might make a promise to citizens that they could not keep.

In December of 2009, the President announced the removal of user fees for antiretroviral treatment (CNLS-IST 2010a). The President ultimately acted alone in deciding to remove user fees in 2009, exercising ‘Big Man rule’ (Hyden 2006).

Those familiar to the events stated that the decision was made without direct input from the National AIDS Council or health ministry, although civil society respondents suggested their meetings with him might have persuaded him. Some respondents reflected that he might have felt social pressure considering that neighbours Mali and Niger, perceived as being even poorer, had already made the decision. A majority of respondents reflected that political or electoral motivations were unlikely.

Evolution and dynamics of the HIV network

The original HIV network might be considered as two distinct sub-groups: government actors and civil society actors. A history of weak government response in the HIV treatment network had created organizational niches for civil society, thus creating a bifurcated network, which was further reinforced by ideological differences. The hierarchical government network featured veto points from the Ministry of Health through the National AIDS Council Permanent Secretariat, and then the President. The government network initially shared a common paradigm, particularly within the dense and closed sub-core of policy elites, but a change in the health minister enabled new network ties between key coalitions and thus a shift in the overall balance of power that led to user fee removal.

The civil society network was dense but decentralized and highly cohesive. These attributes of the civil society network enabled efficient diffusion of ideas and practices throughout the network, namely, the decision not to charge fees to patients. The widespread adoption of this informal institution was an

important factor in eventual policy change. As evidence mounted to discredit the existing paradigm, its exchange created bridges between actors who had been minimally connected and caused the two networks merged, with supportive government staff working together with civil society advocates.

Insert Figure 3c here

Insert Table 2 here

Discussion

Our study builds upon existing literature by marrying concepts of policy networks with institutional, interest- and idea-based theories of policy change. Consistent with those analytic approaches, we observed the important role of institutions, interests and ideas – and particularly changes therein – in influencing prospects for policy reform. Consistent with previous policy network studies, we observed an association between network change and policy change. What this study adds is the synthesis and analysis of the interactions between these two approaches, demonstrating their joint influence on the policy process while suggesting that change processes are generally initiated by changes in one of institutions, interests or ideas. In periods of stability, networks and the 3Is were mutually reinforcing. Typical of complex systems, alterations in one could set off changes in the others, ultimately resulting in opportunities for policy change. In general, we observed directionality that moved from a change in the 3Is, to

networks, to policy processes and outcomes, but in the HIV network we observed instances where endogenous changes in the network led to changes in the 3Is, and then policy change. The HIV network came the closest to what is described as “networked governance” (Provan, Kenis 2008) or “strategic network management” (Klijn, Koppenjan 2000) in the public management literature – that networks are a strategic tool for structuring the policy process and influencing outcomes. Coalition-building in the civil society sub-network was used to advance their policy goals, resulting in a network structure that was decentralized but dense. Decentralized network structures are more conducive to informal, responsive, and innovative governance and institutional behaviours (Provan, Milward 1995, Howlett 2002, Sandstrom, Carlsson 2008). Indeed, the structure of the HIV network enabled policy experimentation and its eventual diffusion, which ultimately informed policy change. Further research is required to understand whether, why and how low-income country policy networks are managed strategically, and what influence this has on policy processes and outcomes.

This study highlighted the important role of external actors. The child health and malaria cases were marked by the influence of external donors, whose rules initiated change processes moving from the 3Is to networks to policy change. In mandating who must be involved in funding processes, external funders altered the composition of existing policy networks, thus allowing the influence of new actors and their ideas. Two points emerge from this observation. First, funding processes have become an integral part of health policy-making, often restructuring existing national policy networks in ways that open a door to

policy change. Second, in bringing these processes to countries, external funders play an important, if indirect, role in shaping national policy-making networks, and thus policy outcomes. It is not clear to what extent funders knowingly aim to reshape policy networks, but their actions seemed to have an effect on the timing of policy change, as well as the order, or magnitude, of change (Hall 1993, Coleman, Skogstad & Atkinson 1996, Howlett 2002). This is an important area for further research.

Strengths and limitations

This study was successful in extending policy network analysis to low-income country policy processes and demonstrating its utility and applicability in this context. Our choice of diverse policy cases improves the generalizability of these results to other policy cases in Burkina Faso and the choice of a relatively typical French-speaking Sub-Saharan African country suggests some degree of external validity. Further research is needed within and outside of Burkina Faso to confirm these findings.

This study is limited by its inability to quantitatively describe changes in network structure over time. Further research should aim to collect temporal data on network structure throughout the policy process. Interview data in this study are limited by recall bias as well as difficulties in accessing development partners for interviews, which is unfortunate considering the role they played in shaping institutions, networks and policy change.

Implications for policy and practice

We hope this study will be useful to policy-makers and practitioners on a number of fronts. First, we hope that those involved in policy-making, as well as researchers, will continue to take a critical and purposeful view towards the policy process and its outcomes, particularly in low-income countries where effective policy solutions are most needed. The complexity of policy-making means that there is no ‘one-size-fits-all’ theory of policy change, or even a set of common factors, but our framework identifies the key variables as well as their change mechanisms. Second, we hope that our focus on networks will encourage the adoption of a network lens in everyday thinking, which we view as critical for managing policy processes in a highly informal, diverse, policy-making environment. This lens resonated with respondents during interviews and we hope it can be applied more deliberately in the future.

Equipping civil society and other national policy actors with the skills to achieve endogenous network change, with the goal of improving the effectiveness of the policy process and its outcomes, is an important area for further research and practice. Levelling the playing field between national and supra-national interests will become increasingly important, particularly as external actors gain skills and knowledge necessary to manage networks to achieve their own aims.

Conclusion

Policy change can be influenced by a variety of factors and an existing theoretical framework suggests institutions, interests and ideas to be the important

overarching categories. Policy scientists have also implicated policy networks – policy actors and their connections to each other – in policy change. This study closes the gap between these two sub-fields within the policy science literature in creating a common framework for their joint influence on policy change. Based on empirical data from three policy cases in Burkina Faso, we found that change was generally led by a shift in one of the 3Is, setting off events in the policy process that alter the other Is, change the structure of the policy network, and lead to policy change. Further research should explore these processes in additional policy cases and settings to build external validity. Even more broadly, this study suggests a new research agenda that continues to define concepts and methods for exploring the integration of network variables into policy science.

References

- Atkinson, M.M. & Coleman, W.D. 1992, "Policy Networks, Policy Communities and the Problems of Governance", *Governance*, vol. 5, no. 2, pp. 154-180.
- Black, R.E., Morris, S.S. & Bryce, J. 2003, "Where and why are 10 million children dying every year?", *Lancet*, vol. 361, no. 9376, pp. 2226-2234.
- Bratton, M. 2007, "Formal versus Informal Institutions in Africa", *Journal of Democracy*, vol. 18, no. 3, pp. 96-110.
- Bryce, J., el Arifeen, S., Pariyo, G., Lanata, C., Gwatkin, D., Habicht, J.P. & Multi-Country Evaluation of IMCI Study Group 2003, "Reducing child mortality: can public health deliver?", *Lancet*, vol. 362, no. 9378, pp. 159-164.
- Bryce, J., Friberg, I.K., Kraushaar, D., Nsona, H., Afenyadu, G.Y., Nare, N., Kyei-Faried, S. & Walker, N. 2010, "LiST as a catalyst in program planning: experiences from Burkina Faso, Ghana and Malawi", *International journal of epidemiology*, vol. 39 Suppl 1, pp. i40-7.
- Burkina Faso 1994, *Loi n° 23/94/ADP du 19 mai 1994, Portant Code de la Santé Publique*, République du Burkina Faso, Ouagadougou.
- Buse, K. & Walt, G. 2002, "The World Health Organization and Global Public-Private Health Partnerships: In Search of “Good” Global Governance" in *Public Private Partnerships for Public Health*, ed. M.R. Reich, Harvard Center for Population and Development Studies, Cambridge.
- CMLS-Santé 2009, *Note technique de la gratuité des ARV au Burkina Faso*, Ministère de la Santé, Ouagadougou.
- CNLS-IST 2010a, , *Le Burkina Faso opte pour la gratuité du traitement par les ARV* [Homepage of Comité national de lutte contre le SIDA et les infections sexuellement transmissibles], [Online]. Available: <http://www.cnls.bf/spip.php?article123> [2012, 10/22].
- CNLS-IST 2010b, *Rapport UNGASS 2010 du Burkina Faso: Suivi de la déclaration d'engagement sur la VIH/SIDA*, Comité national de lutte contre le SIDA et les infections sexuellement transmissibles, Ouagadougou.
- Coleman, W.D., Skogstad, G.D. & Atkinson, M.M. 1996, "Paradigm Shifts and Policy Networks: Cumulative Change in Agriculture", *Journal of Public Policy*, vol. 16, no. 3, pp. 273-301.

- Countdown to 2015. 2012, , *Burkina Faso Maternal and Child Health Data* [Homepage of Countdown to 2015], [Online]. Available: <http://www.countdown2015mnch.org/country-profiles/burkina-faso> [2013, 09/04].
- Direction de la santé de la famille 2010, *Plan stratégique 2010-2014 de la composante communautaire de la prise en charge intégrée des maladies de l'enfant (PCIME-C)*, Ministère de la Santé, Ouagadougou, Burkina Faso.
- Direction de la santé de la famille 2008, *Réponses aux commentaires de l'équipe d'évaluation indépendante dans le cadre de la mise en œuvre de la requête au financement de la Fondation Bill et Melinda Gates.*, Ministère de la Santé, Ouagadougou, Burkina Faso.
- Direction de la santé de la famille 2005, *Prise en charge intégrée des maladies de l'enfant (PCIME): Plan de couverture*, Ministère de la Santé, Ouagadougou, Burkina Faso.
- Dobbin, F., Simmons, B. & Garrett, G. 2007, "The global diffusion of public policies: Social construction, coercion, competition, or learning?", *Annual Review of Sociology*, vol. 33, pp. 449-450-472.
- Elgie, R. 2007, "Varieties of Semi-Presidentialism and Their Impact on Nascent Democracies", *Taiwan Journal of Democracy*, vol. 3, no. 2, pp. 53.
- Gerring, J. 2004, "What is a case study and what is it good for?", *American Political Science Review*, vol. 98, no. 2, pp. 341.
- Haas, P.M. 1992, "Introduction: Epistemic Communities and International Policy Coordination", *International Organization*, vol. 46, no. 1, Knowledge, Power, and International Policy Coordination, pp. 1-35.
- Hall, P.A. 1993, "Policy paradigms, social learning, and the state: the case of economic policymaking in Britain", *Comparative politics*, vol. 25, no. 3, pp. 275.
- Hall, P.A. & Taylor, R.C.R. 1996, "Political Science and the Three New Institutionalisms", *Political Studies*, vol. 44, no. 5, pp. 936-957.
- Hecló, H. 1974, *Modern social politics in Britain and Sweden; from relief to income maintenance*. Yale University Press, New Haven.
- Helmke, G. & Levitsky, S. 2004, "Informal Institutions and Comparative Politics: A Research Agenda", *Perspectives on Politics*, vol. 2, no. 04, pp. 725.

- Howlett, M. 2002, "Do Networks Matter? Linking Policy Network Structure to Policy Outcomes: Evidence from Four Canadian Policy Sectors 1990-2000", *Canadian Journal of Political Science/Revue canadienne de science politique*, vol. 35, no. 02, pp. 235.
- Hyden, G. 2006, *African politics in comparative perspective*, Cambridge University Press, Cambridge.
- Kahler, M. & Lake, D.A. 2004, "Governance in a Global Economy: Political Authority in Transition", *PS: Political Science & Politics*, vol. 37, no. 03, pp. 409.
- Klijn, E. & Koppenjan, J.F.M. 2000, "Public Management and Policy Networks: Foundations of a network approach to governance", *Public Management*, vol. 2, no. 2, pp. 135-158.
- Kouanda, S., Bocoum, F.Y., Doulogou, B., Bila, B., Yameogo, M., Sanou, M.J., Sawadogo, M., Sondo, B., Msellati, P. & Desclaux, A. 2010, "User fees and access to ARV treatment for persons living with HIV/AIDS: implementation and challenges in Burkina Faso, a limited-resource country", *AIDS Care*, vol. 22, no. 9, pp. 1146-1152.
- Kouyate, B. & Nana, V. 2010, "Policy brief on improving access to artemisinin-based combination therapies for malaria in Burkina Faso", *International Journal of Technology Assessment in Health Care*, vol. 26, no. 2, pp. 233-236.
- Kouyate, B., Sie, A., Ye, M., De Allegri, M. & Muller, O. 2007, "The great failure of malaria control in Africa: a district perspective from Burkina Faso", *PLoS medicine*, vol. 4, no. 6, pp. e127.
- Lavis, J.N., Posada, F.B., Haines, A. & Osei, E. 2004, "Use of research to inform public policymaking", *Lancet*, vol. 364, no. 9445, pp. 1615-1621.
- Litvack, J.I., Junaid, A. & Bird, R.M. 1998, *Rethinking decentralization in developing countries*, World Bank, Washington, D.C.
- Lubell, M., Scholz, J., Berardo, R. & Robins, G. 2012, "Testing Policy Theory with Statistical Models of Networks", *Policy Studies Journal*, vol. 40, no. 3, pp. 351-374.
- Marsh, D. 1998, *Comparing policy networks*, Open University Press, Buckingham, England.
- Marsh, D. & Smith, M. 2000, "Understanding Policy Networks: towards a Dialectical Approach", *Political Studies*, vol. 48, no. 1, pp. 4-21.

- Mathews, J. 1997, "Power Shift", *Foreign Affairs*, , pp. 50-66.
- McClurg, S.D. & Young, J.K. 2011, "Political Networks", *PS: Political Science & Politics*, vol. 44, no. 1, pp. 39-43.
- Ministère de la santé 2011, *Comptes nationaux de la santé: année 2009*, Gouvernement du Burkina Faso, Ouagadougou, Burkina Faso.
- Ministère de la santé 2007, *Plan National de Développement Sanitaire: 2006-2010*, Gouvernement du Burkina Faso, Ouagadougou, Burkina Faso.
- North, D.C. 1990, "A transaction cost theory of politics", *Journal of Theoretical Politics*, vol. 2, no. 4, pp. 355.
- Ouedraogo, L.T., Some, I.T., Diarra, M. & Guissou, I.P. 2008, "Self-medication in the treatment of acute malaria: study based on users of private health drug stores in Ouagadougou, Burkina Faso", *Bulletin de la Societe de pathologie exotique (1990)*, vol. 101, no. 2, pp. 124-127.
- Owen-Smith, J. & Powell, W.W. 2008, "Networks and institutions", *The Sage handbook of organizational institutionalism*, , pp. 596-623.
- Pagnoni, F., Convelbo, N., Tiendrebeogo, J., Cousens, S. & Esposito, F. 1997, "A community-based programme to provide prompt and adequate treatment of presumptive malaria in children", *Transactions of the Royal Society of Tropical Medicine and Hygiene*, vol. 91, no. 5, pp. 512-517.
- Palier, B. & Surel, Y. 2005, "Les «trois I» et l'analyse de l'État en action.", *Revue française de science politique*, vol. 55, no. 1, pp. 7-32.
- Peschi, L.M. 2004, *Burkina Faso: Country Coordinating Mechanism, a case study*, Global Fund to Fight AIDS, Tuberculosis and Malaria, Geneva.
- Pierson, P. 1993, "Review: When Effect Becomes Cause: Policy Feedback and Political Change", *World Politics*, vol. 45, no. 4, pp. 595-628.
- Program in Policy Decision-making 2013, , *Evaluating knowledge-translation platforms in low- and middle-income countries* [Homepage of McMaster University], [Online]. Available: <http://www.researchtopolicy.ca/KTPEs/KTPE-overview> [2013, 11/05].
- Programme national de lutte contre le paludisme 2006, *Directives national pour la prise en charge du paludisme au Burkina Faso*, Ministère de la santé, Ouagadougou, Burkina Faso.

- Programme national de lutte contre le paludisme 2004, *Plan stratégique 2005-2007 pour la mise à l'échelle nationale des interventions à base communautaire (IBC)*, Ministère de la santé, Ouagadougou, Burkina Faso.
- Provan, K.G. & Kenis, P. 2008, "Modes of Network Governance: Structure, Management, and Effectiveness", *Journal of Public Administration Research and Theory*, vol. 18, no. 2, pp. 229-252.
- Provan, K.G. & Milward, H.B. 1995, "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems", *Administrative Science Quarterly*, vol. 40, no. 1, pp. 1-33.
- Radaelli, C.M. 1999, "The public policy of the European Union: whither politics of expertise?", *Journal of European public policy*, vol. 6, no. 5, pp. 757.
- Reagans, R. & McEvily, B. 2003, "Network Structures and Knowledge Transfer: The Effects of Cohesion and Range", *Administrative Science Quarterly*, vol. 48, no. 2, pp. 240-267.
- Ridde, V. 2003, "Fees-for-services, cost recovery, and equity in a district of Burkina Faso operating the Bamako Initiative", *Bulletin of the World Health Organization*, vol. 81, no. 7, pp. 532-538.
- Ripley, R.B. & Franklin, G.A. 1990, *Congress, the bureaucracy, and public policy*, 5th – edn, Brooks/Cole Pub. Co., Pacific Grove, Calif.
- Sabatier, P.A. & Weible, C. 2007, "The Advocacy Coalition Framework: Innovations and Clarifications" in *Theories of the policy process*, ed. P.A. Sabatier, 2nd edn, Westview Press, Boulder, Colorado.
- Sandstrom, A. & Carlsson, L. 2008, "The Performance of Policy Networks: The Relation between Network Structure and Network Performance", *Policy Studies Journal*, vol. 36, no. 4, pp. 497-524.
- Seawright, J. & Gerring, J. 2008, "Case Selection Techniques in Case Study Research", *Political Research Quarterly*, vol. 61, no. 2, pp. 294.
- Seck, A. & Valea, D. 2011, *Analyse de la santé communautaire au Burkina Faso*, Ministère de la santé, Ouagadougou, Burkina Faso.
- Sirima, S.B., Konate, A., Tiono, A.B., Convelbo, N., Cousens, S. & Pagnoni, F. 2003, "Early treatment of childhood fevers with pre-packaged antimalarial drugs in the home reduces severe malaria morbidity in Burkina Faso", *Tropical medicine & international health : TM & IH*, vol. 8, no. 2, pp. 133-139.

- Sirima, S.B., Tiono, A.B., Gansane, A., Diarra, A., Ouedraogo, A., Konate, A.T., Kiechel, J.R., Morgan, C.C., Olliaro, P.L. & Taylor, W.R. 2009, "The efficacy and safety of a new fixed-dose combination of amodiaquine and artesunate in young African children with acute uncomplicated Plasmodium falciparum", *Malaria journal*, vol. 8, pp. 48.
- Surel, Y. 2000, "The role of cognitive and normative frames in policy-making", *Journal of European Public Policy*, vol. 7, no. 4, pp. 495-512.
- Tiono, A.B., Kabore, Y., Traore, A., Convelbo, N., Pagnoni, F. & Sirima, S.B. 2008, "Implementation of Home based management of malaria in children reduces the work load for peripheral health facilities in a rural district of Burkina Faso", *Malaria journal*, vol. 7, pp. 201.
- Tipke, M., Louis, V.R., Ye, M., De Allegri, M., Beiersmann, C., Sie, A., Mueller, O. & Jahn, A. 2009, "Access to malaria treatment in young children of rural Burkina Faso", *Malaria journal*, vol. 8, pp. 266.
- UNICEF & INSD 2006, *Burkina Faso: Enquête par grappes à indicateurs multiples*, United Nations Children's Fund & Institut national de la statistique et de la démographie, Ouagadougou, Burkina Faso.
- United Nations Development Programme 2013, 2013-last update, *Burkina Faso, Country Profile: Human Development Indicators* [Homepage of United Nations], [Online]. Available: <http://hdrstats.undp.org/en/countries/profiles/BFA.html> [2013, 09/04].
- Weiss, C.H. 1979, "The many meanings of research utilization", *Public administration review*, vol. 39, no. 5, pp. 426.
- Woelk, G., Daniels, K., Cliff, J., Lewin, S., Sevene, E., Fernandes, B., Mariano, A., Matinhure, S., Oxman, A., Lavis, J. & Lundborg, C. 2009, "Translating research into policy: lessons learned from eclampsia treatment and malaria control in three southern African countries.", *Health research policy and systems*, vol. 7, pp. 31-31.
- World Bank 2011, *Rapport No. 54491-BF. Burkina Faso, Filets sociaux*, World Bank, Region Afrique, Washington, D.C.
- Wright, M. 1988, "Policy Community, Policy Network and Comparative Industrial Policies", *Political Studies*, vol. 36, no. 4, pp. 593-612.

Figure 1. Conceptual framework of 3I and network variables on policy change

**Figure 1. 3I + N
Conceptual Framework**

Institutions (rules) provide the scaffolding that the network is structured on

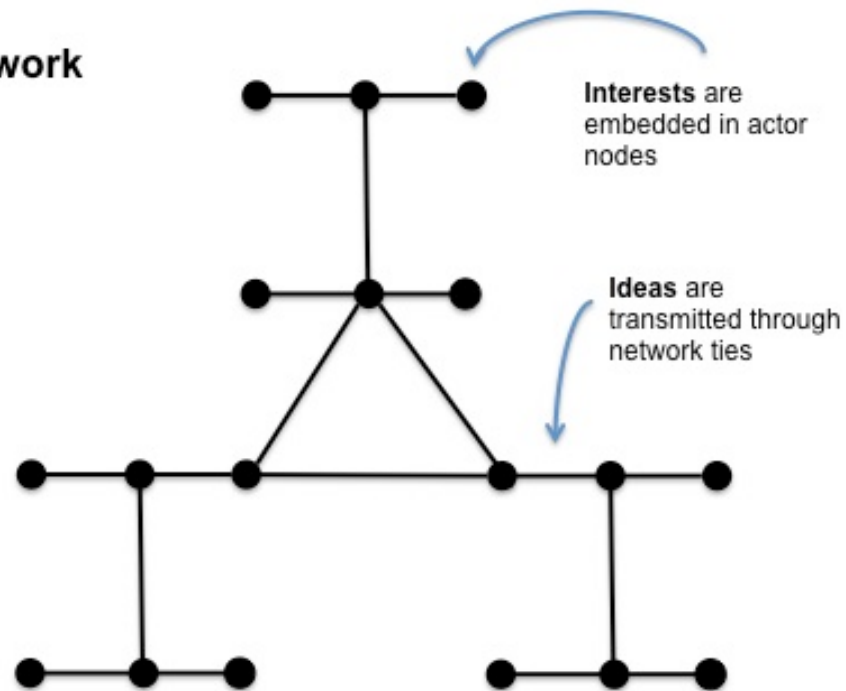
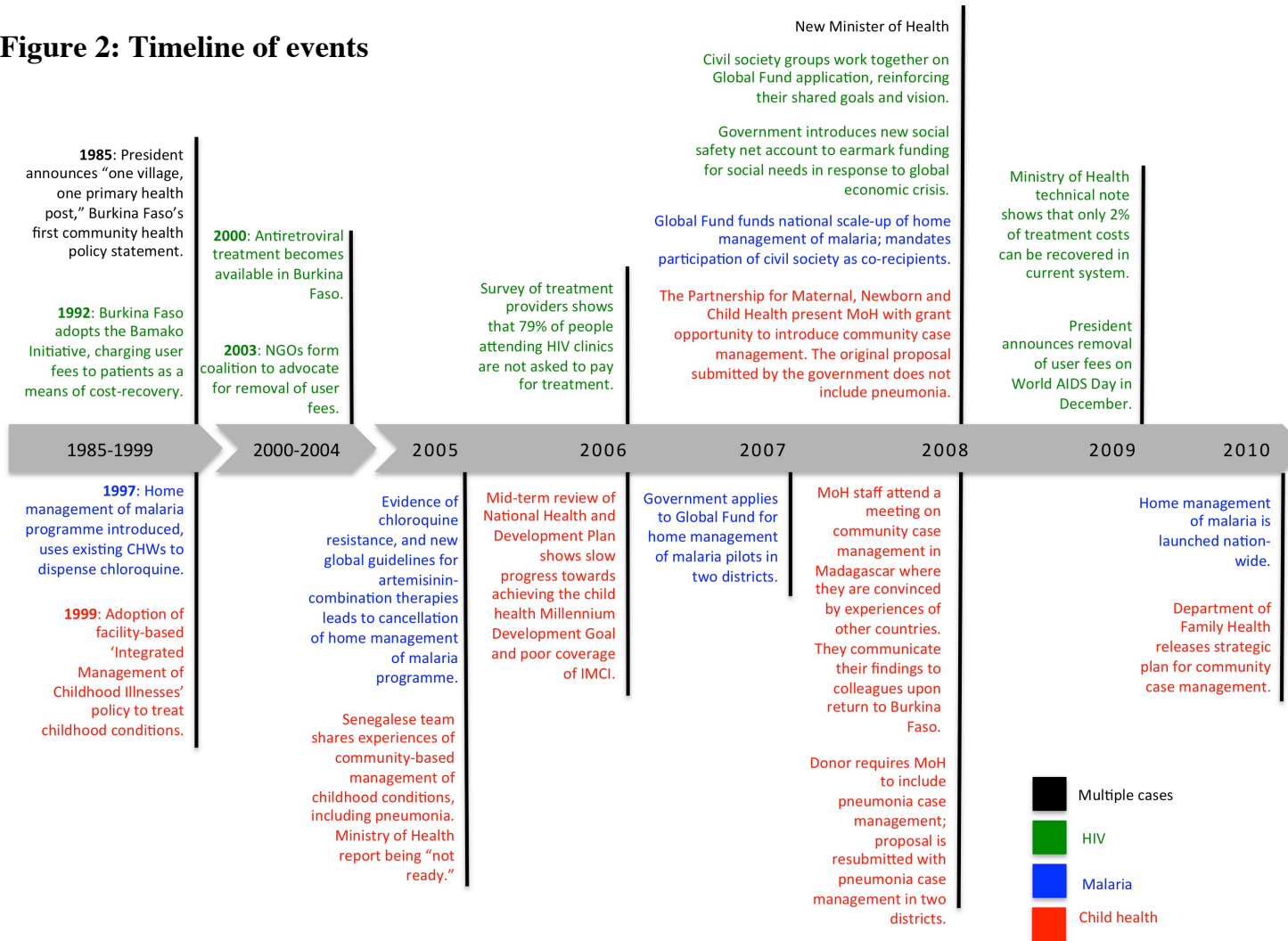


Figure 2: Timeline of events



Figures 3a-c: Observed networks and 3Is

Figure 3a. Child health network

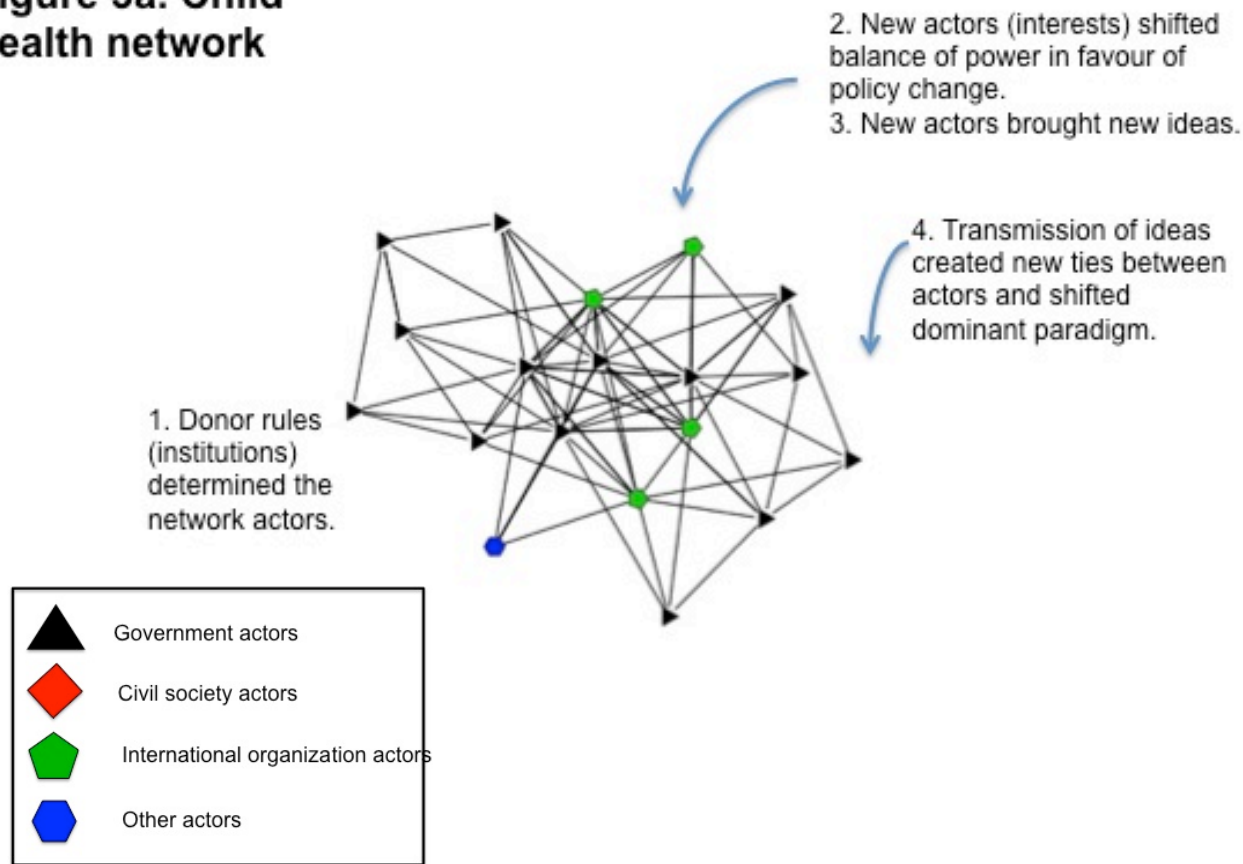


Figure 3b. Malaria network

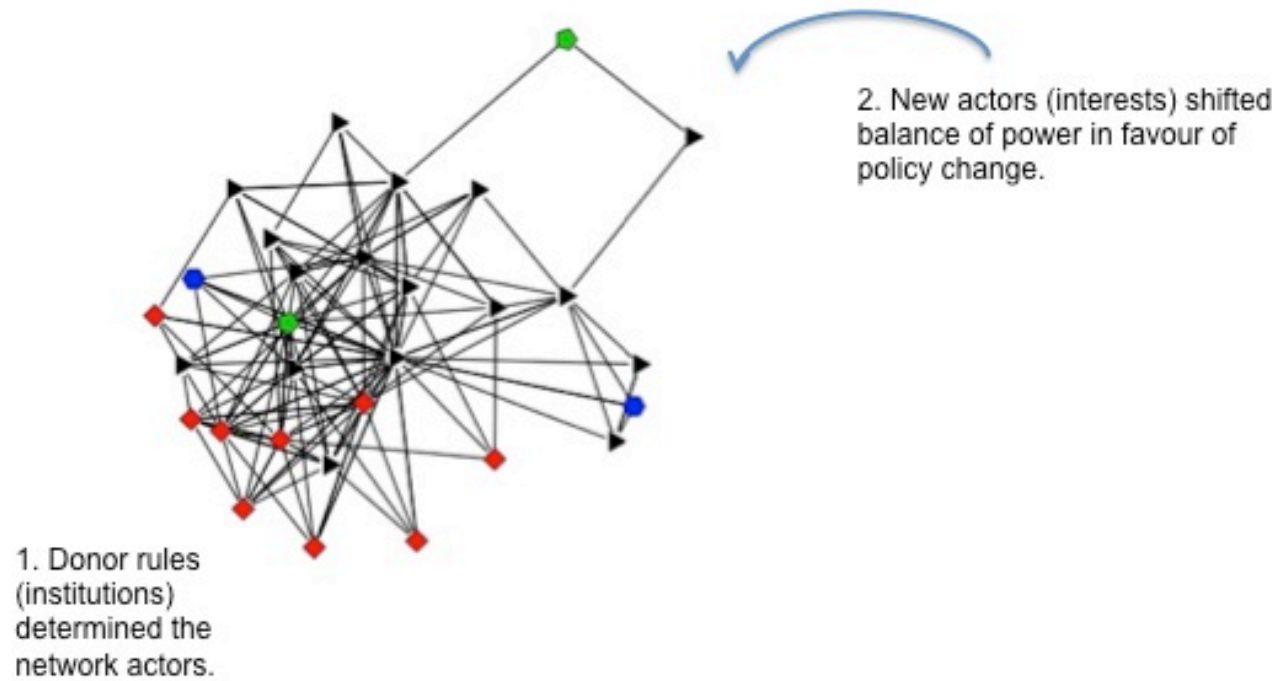


Figure 3c. HIV network

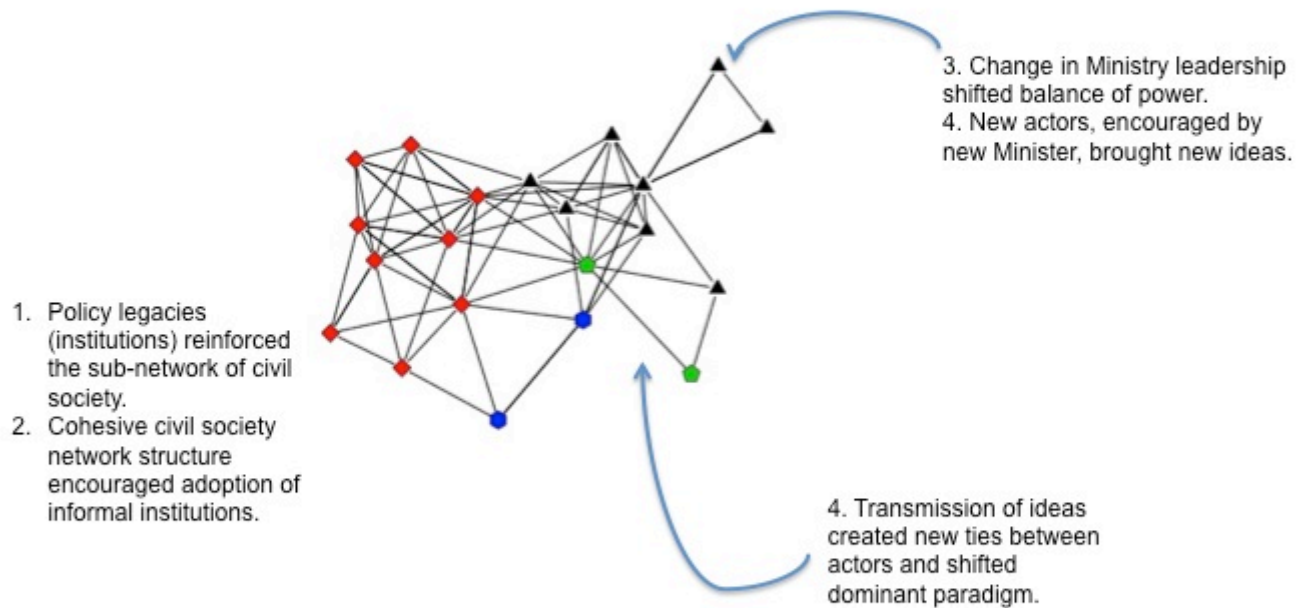


Table 1: Background and overview of the health policy cases

	Child health	Malaria	HIV
Health issue(s) addressed	Child deaths at home or in the community	Malaria deaths in the home or in the community	Financial access to antiretroviral treatment for people living with HIV
Understanding of causes of the issue	Majority of under-five mortality is attributable to pneumonia, malaria, diarrhoea and malnutrition. Children fail to reach health facilities (or arrive too late) due to limited geographic and financial access.	People fail to reach health facilities (or arrive too late) due to limited geographic and financial access.	Limited ability of patients to pay for treatment.
Government authority responsible for the health issue	Division of Family Health in Ministry of Health	National Malaria Control Programme in Ministry of Health	HIV/AIDS office in Ministry of Health and Permanent Secretariat of National AIDS Council
Status quo at start of policy development process	At a national scale, only health workers in health facilities were trained to treat sick children. A small number of non-government organizations had programmes treating malaria, diarrhoea and malnutrition by CHWs, as well as CHWs providing health education.	Previous malaria home management programme cancelled due to chloroquine resistance; new drugs only available from health facilities or private pharmacies.	National policy required patients to pay for treatment: patient cost decreased from US\$27 in 2002 to \$3 in 2008 where 45% of population lives below poverty line of \$1.25 PPP per day (United Nations Development Programme 2013). In practice, few providers charged user fees.
Proposed policy change	Train CHWs to manage childhood pneumonia, malaria, diarrhoea and malnutrition in the community.	Train CHWs to manage malaria in the community using ACTs.	Remove user fees for antiretroviral treatment, rendering it free to patients.
How the issue was	Mid-term evaluation of national health	Consistently high rates of malaria	Concerted advocacy, including rallies

<p>identified (change in indicators, eval of programs, focusing events)</p>	<p>development plan showed failure to progress towards Millennium Development Goals and low coverage and utilization of facility-based strategies. Growing body of experiences from other countries suggested effectiveness and feasibility of community management of childhood illnesses.</p>	<p>morbidity and mortality; international focus on home management of malaria; growing awareness of private and illegal sale of ACTs; local studies to show feasibility of home management with ACTs.</p>	<p>and communication campaigns, for universal access to treatment by civil society informed by their real-world experiences; study showing that few patients could afford antiretroviral treatment and thus did not pay.</p>
<p>Policy decision (date) and reference documents</p>	<p>Introduce community case management in two regions, and pilot the pneumonia component in two districts (2008) as part of a grant proposal. Written into policy in <u>Strategic Plan for the Community Integrated Management of Childhood Illness</u> (2010)</p>	<p>Introduce home management of malaria nation-wide, implemented by National Malaria Control Programme and non-government organizations (2008). Written into policy in <u>Strategic Plan for the Fight Against Malaria: 2006-2010</u> (2007); funded through <u>Burkina Faso’s Proposal to Global Fund Round 7</u> (2007) and <u>Burkina Faso’s Proposal to Global Fund Round 8</u> (2008)</p>	<p>Removal of user fees for antiretroviral treatment (2009). Announced by President in public and in press release: “Burkina Opts for Removal of User Fees” (2010)</p>

Table 2: Interactions between 3-I variables and networks and their influence on policy change

	Child health	Malaria	HIV
Institutions	<p>Donor rules encouraged the entry of new actors and their ideas, reshaping the policy network.</p> <p><i>New actors and ideas were essential in initiating and pushing through policy change.</i></p>	<p>Donor rules encouraged the entry of new actors and their ideas, reshaping the policy network.</p> <p>Policy legacies of malaria home management favoured its reinstatement.</p> <p><i>New actors, as well as favourable policy legacies, enabled the adoption of the policy proposal.</i></p>	<p>Policy legacies of civil society participation in treatment provision created organizational niches, which reinforced their cohesive network.</p> <p><i>Cohesive civil society network encouraged adoption and diffusion of informal institutions, which influenced formal policy change.</i></p>
Interests	<p>Introduction of new interests, embedded in new actors, changed network structure and shifted balance of interest power.</p> <p><i>New balance of power favoured policy change.</i></p>	<p>Introduction of new interests, embedded in new actors, changed network structure and shifted balance of interest power.</p> <p><i>New balance of power favoured policy process and policy instruments that implicated civil society.</i></p>	<p>Strength of civil society network increased its power and influence.</p> <p>Change in leadership created new opportunities and incentives for ties between actors, changing network structure.</p> <p><i>New balance of power favoured policy change.</i></p>
Ideas	<p>New evidence demonstrated failure of facility-based paradigm and successful community case management experiences. Its</p>	<p><i>New actors had experience and knowledge necessary to implement policy proposal.</i></p>	<p>Evidence demonstrated failure of existing paradigm. Its exchange created new ties, altering network structure.</p>

	<p>exchange created new ties, altering network structure.</p> <p><i>The spread of new ideas moved the policy process from agenda-setting to formulation, resulting in policy change.</i></p>		<p><i>The spread of new evidence influenced policy change.</i></p>
External events	External funding opportunity	External funding opportunity	Internal funding opportunity

Chapter 3: Evidence-informed policy-making and policy innovation in Burkina Faso: does policy network structure matter?

Abstract

The application of social network analysis to policy networks continues to grow, including the application of social network analysis tools and concepts in order to explain policy outcomes. Gaps in this field of study persist in terms of both policy issues studied, as well as types of polities, or networks, analysed. This study extends previous research on the role of network structure in shaping policy outcomes by analysing network structure's effect on the use of research evidence, and the resulting innovativeness, of three health policy networks in Burkina Faso, a low-income West African country. This comparative case study confirms hypotheses related to the effect of network closure and heterogeneity on evidence use and innovation; namely, that heterogeneous networks are more likely to be exposed to new ideas, and thus to use research evidence and adopt innovative policies. High levels of centralized control and power will support innovation when the new ideas are consistent with the dominant network paradigms; otherwise, new ideas will receive less traction. These findings confirm previous research and point to opportunities to shape networks to achieve innovation and policy change based on the best evidence.

Introduction

The application of social network analysis (SNA) to the study of policy processes has received increased attention in recent years (Lazer 2011, Lubell et al. 2012), thanks in part to the ‘relational turn’ in political science and to the growing complexity of public sector governance. As a theoretical paradigm, SNA – the study of actors and their relationships to each other – has been used to understand how resources, information, influence and social capital are embedded among actors in policy-making processes (Marsh, Smith 2000). Networks have important “behavioural, perceptual, and attitudinal consequences for the individual units and for the system as a whole” (Knoke 1990), implicating networks as key explanatory variables in the outcomes of policy processes.

As a methodological approach, SNA provides a set of tools particularly well suited for the study of contemporary policy-making, which often eschews traditional, formal hierarchies and rules for dynamic and evolving systems of actors. Analysis of these processes thus require methods that enable the identification and measurement of actors and their behaviours without being constrained by traditional ideas of power and control, resource flows, or organizational hierarchies. A network approach to data collection can uncover the otherwise hidden elements of social or political systems.

A more recent shift away from ‘network as metaphor’ has applied theory and empiric data collection to associate networks with their policy outcomes. Beginning with Provan and Milward’s (1995) seminal study of the structure and performance of mental health implementation networks, one area of focus has

been the ability of network structure to explain network function. Network structure – the specific actors, or nodes, in a network, their ties to each other, and how those ties form a global-level system – reflects opportunities and constraints, or incentives and costs, of individual and collective action (Lin 1999). Structural characteristics can be measured, described quantitatively and graphically, and compared to theoretically plausible outcomes. For example, previous studies of policy networks have linked network density, centralization, and heterogeneity to outcomes of efficiency, innovativeness, and capacity for policy change (Howlett 2002, Sandstrom, Carlsson 2008). Like those studies and others, we treat the structure of a policy network as an important explanatory variable in determining policy process outcomes.

The body of work linking policy network structure to function has yet to explore policy networks in low-income countries despite the potential fit. Policy processes in low-income countries are characterised by their diversity of participants and the informal nature of the rules that govern them (Stone 2008). Low-income country policy-making is socially heterogeneous, with actors from international organizations (IO), bilateral partners, non-government organizations, civil society organizations, philanthropic organizations, researchers and consultants, not to mention politicians and bureaucrats from implicated nations (Woelk et al. 2009). Actors may be nationals or foreigners, may represent any level of power from transnational to sub-district administrative levels of local government, and may be private or public in nature (Mathews 1997). Weak states and the relative power of individuals and non-state actors mean that informal rules

and procedures often trump the official versions (Hyden 2006). Capturing these networks begins with collecting data on actors and their dyads; analysing these networks and their outcomes requires a theoretical frame that acknowledges the interconnectedness of actors and the effects of their interactions on whole systems. A larger disposition of this research project aimed to test the proposition that policy network analysis is feasible and informative for low-income countries and so we collected data on health policy networks and processes in Burkina Faso, in West Africa.

Dependent variables: evidence use and innovativeness

To be relevant, studies of policy network structure and outcomes must address outcomes that are of theoretical and practical importance. ‘Policy innovativeness’ is both, in part because policy change is relatively rare (Hall 1993), but also because it is often necessary in order to achieve important societal goals. This study is modelled on others that examine policy innovativeness as an outcome (Howlett 2002, Sandstrom, Carlsson 2008).

This chapter analyses a second dependent variable of interest: the use of research evidence in policy-making. This particular outcome has never been tested in relation to policy network structure despite its theoretical plausibility and its relevance to policy. The increasingly complex and technical nature of policy problems and their solutions has led to a growing academic interest in the role of science and information in policy-making (Contandriopoulos et al. 2010). Particularly in the health domain, international organizations have called for the

use of research evidence in policy-making in an effort to maximize health gains in severely resource-constrained contexts (WHO 2004).

This study aims to determine whether network structure is related to (1) the use of research evidence; and (2) the innovativeness of the policy decision across three health policy networks in Burkina Faso. We operationalize evidence use and innovativeness using multiple methods to analyse interview data from policy actors. Those outcomes are compared to empiric measurements of policy network structure across the cases. Findings suggest that network structure, particularly heterogeneity, is associated with evidence use and innovativeness in this setting.

Research methods

This study is a comparative case study combining qualitative research methods with quantitative social network analysis methods to understand the structure and function of three health policy networks at the national policy-making level in Burkina Faso.

Policy case selection

Following Gerring (2004), we define a case study as an “intensive study of a single unit for the purposes of understanding a larger class of (similar) units.” Our unit of analysis is Burkina Faso and our cases are unique health policy processes embedded within. Burkina Faso was chosen for pragmatic and logistic considerations, including the lead researcher’s existing relationships with policy-

makers in the Ministry of Health through a related project – “Evaluating Knowledge-Translation Platforms in Low- and Middle-Income Countries” (Program in Policy Decision-making 2013) – thus ensuring access to other policy-makers. Burkina Faso is typical of other Sub-Saharan African countries in many general respects such as level of development, political regime type, and foreign-aid dependency. The health policy sector, with its diversity of actors and its fluidity of institutions, is not unlike most low-income countries’ policy domains, thus ensuring that these results will be as externally valid as is possible with a single country case study.

The individual policy cases were also chosen partly for pragmatic and logistic reasons, including public availability of documents and adequate network sizes to enable statistical analyses. Cases were also selected according to our pre-study, non-empirical perceptions of their ‘diversity’ on independent variables of interest (Seawright, Gerring 2008), namely heterogeneity of actors and how open or closed the networks were, in order to explore and confirm theoretical propositions about the network factors that lead to policy change and evidence use. Three policy cases were thus chosen: “Community Integrated Management of Childhood Illness,” a child health programme which trains community health workers (CHW) to diagnose and treat malaria, pneumonia, diarrhoea and malnutrition in the community; “home management of malaria,” a malaria programme which uses CHWs to diagnose and treat uncomplicated malaria in the community using artemisinin based combination therapies; and the removal of

user fees for antiretroviral (ARV) treatment. These cases will be hereto referred to by their substantive themes: ‘child health’; ‘malaria’; and ‘HIV’.

Data collection procedures

Evidence use and innovativeness

The lead researcher was based in the national ministry of health during the study period June 2011 to March 2012. A document review was undertaken to create a narrative of each of the three policy cases and to inform the initial selection of respondents. In-depth interviews were carried out with key policy actors, including health bureaucrats, staff of international organizations, non-governmental organizations and researchers. Interviews followed a semi-structured guide that touched on key themes related to issue identification and policy formulation, including the role of institutions, ideas and interests. Questions were also asked about the dependent variables in this study: the use of research evidence and how innovative the resulting policy decision was. The interview guide was tested prior to finalization. Interviews were conducted in French and tape-recorded, lasting approximately 45 minutes long. Notes were taken during interviews.

Network data

During interviews, the lead researcher administered a questionnaire with the aim of mapping each interview’s social networks during the policy process. The policy ‘process’ was defined for respondents in a way that established clear

temporal boundaries (Yin 1999); for example, the writing of a grant proposal or the development of a strategic plan. Respondents were encouraged to provide as many names as they could recall, known as a ‘name generator’ in social network analysis (Knoke, Yang 2008), and were prompted using organizational affiliations (i.e., “Did you interact with anyone from the department of child health?”). Names were noted in the questionnaire and then the respondent was asked, for each name provided, whether he/she had *provided* that person research evidence, or *requested* research evidence from that person. In this way three networks were produced for each policy process: a network of (1) interaction ties; (2) evidence provision ties; and (3) evidence request ties. Provision and request ties are conceptually different (i.e., they are not opposite): one or both may exist between a pair of actors. They are considered directed ties with an arrow indicating the direction of the relationship; it is possible for the same tie to exist in both directions between a pair of actors. Interaction ties, on the other hand, are coded as non-directed.

All respondents were identified according to this process. Actors named during the social network survey were then approached for their own interview and survey. We made the decision to halt the collection of new names following the fourth round of respondent-driven sampling as the fourth round of name generation elicited only 23 nominations out of a total of 116 from previous rounds. The survey instrument asked additional questions about respondents’ demographic and job-related information, including job title and organization and educational and professional experience.

Measurement

The study outcomes – evidence use and innovativeness – are measured at the policy network level, and thus extensive synthesis and triangulation of data were required in order to reach conclusions about each. Documents describing past policies were analysed with a historical lens to contextualize and understand the innovativeness of each policy decision. Documents related to the production of research evidence (i.e., scientific reports and studies) were cross-referenced to evidence mentioned in interviews to determine the extent to which respondents: (a) were aware of, and exchanged, available evidence; and (b) correctly interpreted that evidence.

Interview transcripts were read multiple times with particular attention paid to segments that discussed evidence use and innovativeness. Codes were applied to interview text according to a predefined codebook, which was pilot tested prior to widespread use. Codes were generated from categories of evidence use and innovativeness as described in each section below.

Evidence use

Because evidence is often used in multiple ways within a network, we sought to identify the primary way in which evidence was used in decision-making. While many uses may have contributed to an eventual decision, only one could be considered as necessary in the final decision.

Social scientists have long aimed to describe the nuanced ways in which research evidence feeds into and is used in public policy debates (Weiss 1979,

Beyer, Trice 1982, Innvaer 2002). This chapter uses the terminology described by Beyer and Trice (1982): instrumental; conceptual; and symbolic use; and applies these concepts to the analysis of the use of evidence by the policy network as a whole, in arriving at a policy decision. That is, while policy actors themselves can use evidence to inform their decisions (Shearer 2013b), we are interested in the extent to which the overall policy decision was informed by research evidence. Research evidence is occasionally used *instrumentally*, to directly inform a given policy problem. In this conceptualization, research evidence fills a knowledge gap necessary to make a decision. While this direct orientation is attractive to many, it is relatively rare. The contentious nature of policy-making tends to favour other policy inputs over evidence, including institutional constraints, interest groups pressure, or other types of ideas or values (Lavis et al. 2004). Even when evidence might be afforded a role, it may not be available, accessible, or relevant (Lavis et al. 2004). Radaelli (1999) suggests that the instrumental use of evidence occurs most often for policy issues that are highly technical with low political salience. Evidence use was coded as instrumental if actors in the network sought evidence to answer specific questions during the policy process, and if the evidence located through the process directly informed problem identification or policy formulation.

The *conceptual* use of evidence describes a process by which policy actors are influenced, perhaps even sub-consciously, by their exposure to research evidence over time. Evidence becomes part of an actor's general knowledge and can be called upon to inform their decision-making. As opposed to single studies

or findings, conceptual evidence is often derived from general concepts and theoretical perspectives that come to enlighten actors' views on an issue through their percolation and diffusion through multiple channels (Weiss 1979). Beyer and Trice (1982) report that this is the most common way in which evidence is used and we imagine that conceptual use would be even more likely for policy issues in which there is an established local research community or long-standing body of research on the topic. We consider policy cases to have used evidence conceptually if interviewees either mentioned evidence specifically, or discussed broader ideas and concepts consistent with the evidence that we know is available from the documentary review, and the policy decision is *consistent* with the concepts and findings of this evidence, but did not depend on it directly.

Finally, the *symbolic* use of evidence refers to use that legitimizes pre-determined policy positions or decisions. Some authors suggest that this post-hoc application of evidence is even more common than conceptual uses (Beyer, Trice 1982). The requirement of evidence by certain jurisdictions or in funding proposals may lead to its symbolic use. Finding and using evidence in such proposals may be in fact legitimizing decisions already made. Weiss (1979) suggests that this is not wrong so long as the findings are interpreted accurately and not taken out of context. Other symbolic uses are not so benign, including the distortion of findings (Weiss 1979, Beyer, Trice 1982). An equally problematic but lesser discussed mis-use is the selective use of evidence in settings where capacities to access and interpret evidence are unequally distributed. In Burkina Faso, where access to research evidence is often a function of nationality or

employment by an IO, its selective use is potentially problematic. Evidence use was coded as symbolic if actors used it to justify a pre-determined position, or interpreted it selectively as a bargaining tool in the policy process.

Policy innovativeness

In this study, policy *innovativeness* refers to the magnitude of a policy change as compared to the status quo. The “stuff of normal policy-making” is described as incremental and piecemeal (Howlett 2002). Paradigmatic change – large shifts in policy goals that are associated with periods of upheaval – is less common. While policy change is not always necessary – the status quo may be perfectly effective at addressing societal problems – there are times when new solutions are required to address new, or existing policy problems. In an effort to categorize levels of change, Peter Hall (1993) developed a taxonomy of ‘orders’ of change. The present study applied this taxonomy to the outcome of each policy process in order to determine which ‘order’ of change had occurred, as has been done elsewhere for studies of policy networks and policy change (Coleman, Skogstad & Atkinson 1996, Howlett 2002). Operationalizing this process required understanding the policy issue’s status quo at the beginning of the process and then determining from study data how the process ultimately changed the policy, its instruments, its strategies or its goals.

In first order change, only the settings of existing policy instruments are tweaked. For example, recognition that malaria cases are not being effectively treated might lead policy-makers to change the drug dosage. Recognition that the cause of the problem is incorrect drug administration might result in policy-

makers deciding to increase time CHWs spend in training. In both cases, the programme itself is not altered, merely the individual elements of the activities in the programme. Such changes involves incremental problem-solving and decision-making typical of policy issues. These changes are likely to be technical in nature and unlikely to attract much opposition or political attention. Policy changes were coded as first order if they maintained the programmatic goals, maintained the general way in which the programme was carried out, remained convinced of the overall theory of change within the programme, but changed the way in which the programme theory was achieved.

Second order change involves a change in the policy instrument itself, while maintaining the hierarchy of policy goals. For example, evidence showing that malaria patients do not seek treatment at health facilities might result in a change of the instrument of delivery; for example, a decision to devolve malaria treatment from the facility-level to the community-level. The goal is still to treat malaria, but the instrument for achieving this goal has changed. Policy changes were coded as second order if they maintained the programmatic goals, but involved a substantial shift in how the programme was carried out.

Third order change, which is relatively rare, involves changing the policy goals themselves. Third order change generally occurs because of massive upheaval, often caused by external events, which suggest major flaws of the dominant paradigm. Peter Hall's (1993) classic example was Britain's shift from Keynesian to monetarist modes of macroeconomic regulation during the 1970s. In the malaria example, third order change might involve the shift from disease

management to prevention goals, although in reality, most malaria programmes would already have both goals and such goals are not in ideological tension with each other. A more paradigmatic shift in public health might be that of harm reduction strategies for injection drug users (Buchanan et al. 2003). Changes were coded as third order if they involved substantial paradigmatic upheaval and resulted in a change in programmatic goals.

Measurement: network structure

Social network statistics were calculated based on each policy case's whole network and were determined according to existing algorithms in the software package. 'Size' is a count of network actors. 'Density' is the proportion of ties that exist among all possible ties in the network. 'Centralization' was calculated according to Freeman's (1979) definition of centralization as an index of differences between the centrality of the most central actor and all others. Together, density and centralization proximate network closure, or the ability of a network to work together to achieve a collective outcome (Coleman, Skogstad 1990, Atkinson, Coleman 1992). On the other hand, exposure to external networks – 'heterogeneity' – increases social capital by facilitating access to new ideas and actors (Burt 2004). 'Heterogeneity' was broken into two measures: 'diversity', which counted the number of distinct organizations represented by actors in the network; and 'cross-boundary' which computed the proportion of ties which spanned two different organizational types.¹ Each of these statistics were

¹ Actors were coded as belonging to one of the following 'types' of organizations: government; international organizations (which includes bilateral actors, donors, and technical assistance); non-government/civil-society organizations; and other.

calculated for each of the nine whole networks: interaction; evidence provision; and evidence request for each of the three policy cases. Network graphs were produced to enable further exploration and illustration of the data. Consistent with social network analysis, actor nodes can be coded to represent their attributes (i.e., colours represent organizations). Social network data were managed in Microsoft Excel and analysed in R statistical software, including the ‘network’ package.

Hypotheses

Following are hypotheses related to network structure (density, centralization and heterogeneity) and the dependent variables: evidence use and innovativeness. Hypotheses linking network structure to innovativeness were largely based on previous theoretical and empiric work from policy sciences (Howlett 2002, Sandstrom, Carlsson 2008) as well as more general theories about the diffusion and adoption of innovations in networks (Rogers 2003). Because of the paucity of theoretical or empirical work specific to the use of evidence in policy networks, those hypotheses drew from knowledge transfer literature from the field of organizational sciences (Hansen 2002, Borgatti 2003, Reagans, McEvily 2003, Inkpen, Tsang 2005).

Network density has been associated both positively and negatively with the spread and use of ideas, as well as innovation. A key network hypothesis is that high levels of interconnectedness within a network facilitate communication, the creation of common norms, and control over opportunistic behaviour (Coleman, Skogstad 1990). These features favour the transfer of complex knowledge by providing a supportive environment for asking questions and

clarifying information and a shared knowledge or skills base that facilitates the transfer of knowledge (Hansen 2002, Reagans, McEvily 2003). When this knowledge is consistent with the network's norms, density will facilitate its adoption into practice (Buskens 2002, Reagans, McEvily 2003). On the other hand, the same features limit opportunities and/or incentives to introduce new evidence that might challenge the status quo. We expect that network density will facilitate the spread and use of new evidence when this evidence does not challenge the dominant norms of the network.

The high levels of group cohesion and shared norms typical of dense networks are considered barriers to innovation. Tsebelis (1995) argued that policy stability increases with the internal congruence of collective political actors, and cohesive networks are likely to continually reinforce procedures, norms and institutional rules. Marsh (1998) observed that dense networks tended to constrain the policy agenda and resulted in continuity. Sandstrom (2008) found a negative association between network closure (a combination of density and centralization) and innovation and suggested that dense networks promoted the status quo and limited incentives for change.

H1: The use of research evidence will be positively associated with network density (provided it is consistent with the network's norms).

H4: Policy innovativeness will be negatively associated with network density.

Centralization measures how control is distributed across actors. A network with complete centralization would have all ties going to one single actor; a network with low centralization would have ties equally dispersed among all actors. Centralization enables efficient coordination of network behaviours provided that the behaviour is sent from the top (Rogers, Shoemaker 1971, Provan, Milward 1995). For activities such as the dissemination of new ideas and innovations, which tend to emerge from outside or within the network, centralization is often considered a barrier. Decentralization facilitates knowledge transfer in that it encourages lateral ties among many instead of between a small few (Inkpen, Tsang 2005). Decentralized organizational structures have been associated with greater use of research than centralized structures (Deshpande 1982) but decentralization has also been linked to the emergence of policy vacuums, where research is not used (but policy decisions are not made, either) (Corwin, Louis 1982). The utilization of research evidence can also be viewed through an innovations lens (Rogers 2003), whereby the adoption of innovations are more likely in decentralized networks (Rogers 2003, Sandstrom, Carlsson 2008, Lewis 2006). Sandstrom (2008) found that highly centralized policy networks were less likely to be innovative in policy-making, suggesting that few incentives existed in such networks to upend the status quo.

H2: The use of research evidence will be negatively associated with network centralization.

H5: Policy innovativeness will be negatively associated with network centralization.

Together, centralization and density proximate network closure, or the degree to which a network's inner core is tightly bound. In contrast, *heterogeneity* indicates how exposed the inner core is to outside influence and ideas. Heterogeneous networks are rich in social capital and constantly exposed to new actors and their ideas. Mintrom and Vergari (1998) distinguish between external and internal policy networks, and argue that external networks – or connections to other networks – are accessed to generate new ideas. The actors who bridge these 'structural holes' can connect to actors in otherwise unconnected external network and bring in new ideas (Burt 2004, Considine, Lewis 2007). Reagans and McEvily (2003) demonstrated that heterogeneous networks supported the knowledge transfer process.

Networks with greater levels of heterogeneity and openness to external actors have been associated with more innovative policy-making (Howlett 2002, Sandstrom, Carlsson 2008). Howlett (2002) said that policy change required both new actors and new ideas, each of which are more likely in heterogeneous networks. Sandstrom (2008) demonstrated that actors who bridged structural holes were more exposed to, and thus more likely to offer up, new policy solutions. These networks' resulting policies were more innovative.

H3: The use of research evidence will be positively associated with network heterogeneity.

H6: Policy innovativeness will be positively associated with network heterogeneity.

Results

This section begins with an overview of each policy case and then describes the findings in relation to network function and outcomes (summarized in Table 1). We then report the network structure findings before synthesizing the body of results in order to draw conclusions about the role of network structure in network function.

Insert Table 1 here

Child health

In 2008, the Partnership for Maternal, Newborn and Child Health approached the Burkina Faso Ministry of Health with a funding opportunity to accelerate child survival through the community-based management of diarrhoea, malaria, and pneumonia by CHWs. The grant-writing process brought together actors from the Ministry of Health as well as from international organizations' country offices, whom the funder had given a seat at the table through various funding conditions (Shearer 2013a).

Unlike diarrhoea, malaria, and a handful of other health activities which were being treated by community health workers, the use of antibiotics to treat pneumonia was legally confined to trained health professionals and the government had historically been reticent to allow CHWs, who were predominately illiterate, to use potentially dangerous antibiotics in children. Such a paradigm shift, from facility- to community-based treatment of pneumonia, might be considered evidence of higher-order policy change. It would have required a normative acceptance of community health workers as well as the practical changes to policy instruments necessary to support such a programme (i.e., training and supervision for CHWs, new drug procurement systems, etc.). However, although the government slowly moved towards this *second-order* change, the eventual decision was made largely by funder conditionalities, which mandated the inclusion of pneumonia. In light of how this decision was made, we consider it less innovative and code it as first order change (see Table 1).

UNICEF and other IO partners actively disseminated research evidence during the grant writing process. These actors believed in the effectiveness and feasibility of community-based strategies, including the management of pneumonia by CHWs, as evidenced by their on-going efforts in implementing similar programmes and in publishing guidelines (World Health Organization and United Nations Children Fund 2004, UNICEF 2005). UNICEF disseminated research evidence and positive experiences of other countries in order to persuade reticent Ministry of Health staff. Respondents reported one particular journal series on child health as being highly salient, in part for its publication in a

prestigious medical journal. However, despite drawing significant attention to the issue, the series in question did not focus on community-based management (Jones et al. 2003, Bryce et al. 2003), suggesting that its use in advocacy was at best an honest – or at worst a knowing and strategic – misinterpretation of evidence to justify their position.

The government's use of evidence during the process was slightly different. While exposed to the evidence disseminated by UNICEF and other IOs, a select few health bureaucrats also visited successful programmes in neighbouring countries. A health bureaucrat who travelled to a regional meeting on community based treatment in 2008 returned to Burkina Faso convinced of its possible effectiveness and feasibility and communicated his findings to colleagues. Evidence thus diffused through the policy network over time to lay the groundwork for its conceptual application to decision-making. However, despite the growing conceptual uses of evidence by the actors in this case, the final decision to include pneumonia was made by the funders, and had been the funders' predetermined position all along. Thus, evidence did not factor in an instrumental or conceptual way in the ultimate decision. We thus code evidence use in this case as 'symbolic.'

Malaria

The malaria network also formed in order to write a funding proposal whose objective was the reinstatement of the community-based management of uncomplicated malaria by community health workers. The previous programme had been cancelled due to drug resistance and thus the new policy would also

introduce a new drug. In contrast to pneumonia, malaria had a long history of community management in Burkina Faso and an established local research community. Health bureaucrats and communities were highly supportive of the reinstatement of the programme, as were civil society implementing partners who had been involved in smaller scale pilot work. In addition to updating the drug, a new implementation strategy was introduced – contractualization – which contracted civil society organizations to implement the government programme in order to achieve national coverage. While the reinstatement of the programme alone is not particularly innovative, the use of civil society contractors at this scale is. We consider this a new policy instrument, and thus second order change.

The existence of the malaria research programme ensured that evidence was used conceptually by most actors in this network. Some research questions had been posed instrumentally to answer timely policy problems, including: “Can home-based management of malaria reduce workload at health facilities?” (Tiono et al. 2008) as well as those answered by local studies on the efficacy of the new drug (Sirima et al. 2009) but these research studies did not seem to be a necessary condition for a new programme. Instead, the decision to scale up home-based management nationally was based largely on the offer of new funds, but supported conceptually by a long history of successful home-based malaria management in the country. We thus code evidence use as ‘conceptual’ in this case.

HIV

The process surrounding the removal of user fees for HIV treatment was the longest from start to finish, exhibited the greatest amount of conflict between the sides of the issue, and was least influenced by external funders and IOs. The issue of free HIV treatment pitted civil society actors, who considered it a human rights issue, against government policy elites, who believed in individual responsibility. Yet despite the level of contestation around the issue, the idea of fee exemptions was not particularly innovative. The poorest “indigent” population were already exempt from paying for many health services, including HIV treatment. Exemption and subsidy schemes had been introduced for other conditions, including emergency obstetric and neonatal care (Ridde et al. 2011), malaria treatment, and tuberculosis. Neighbouring countries had opted to provide antiretroviral (ARV) treatment for free, including Mali and Niger whom respondents suggested had even fewer resources. Meanwhile, HIV service providers began to informally excuse patients from paying fees for their ARV treatment, leading to the widespread practice of free drugs, despite the formal policy suggesting otherwise. For these reasons we code this case as first order change – the tweaking of a policy instrument (fee exemption) to include all patients.

Somewhat surprisingly, the HIV network may have had the most instrumental use of evidence. The practice of informal exemptions was measured through a survey in 2006 and reported in a published article (Kouanda et al. 2010), which was mentioned by a large proportion of respondents. Technical analyses commissioned by the health ministry found that the government was

recouping less than 2% of their costs (Derme 2007, CMLS-Santé 2009). While civil society actors had based their position on lived experiences, they harnessed the growing body of evidence to advocate their position in meetings with government policy elites, including the President of Burkina Faso. Thus, we code the use of evidence in this case as instrumental.

Network structure and its relationship to outcomes

The next section presents the results of the quantitative social network analysis, describing network size, closure (density and centralization), and heterogeneity (diversity and cross-boundary ties). Tables 2a-c describe numeric results and Figures 1a-c show network graphs.

Insert Tables 2a-c here

Child health

The network of interaction ties for the child health policy case was relatively dense, with 39.8% of all possible ties completed between actors (see Table 2a). This finding reflects the grant writing process, which brought together key actors in a series of relatively intensive meetings. When examining evidence provision and request ties, we see similar patterns but at a much smaller magnitude (Tables 2b-c). The evidence provision network was four times less dense (density: 0.108) and the request network 16 times less dense (density: 0.024), meaning that there were far fewer provision ties and even fewer request ties in this group of actors as compared to basic interactions. The child health

network's centralization score was 0.300 – 30% of all ties are connected to one actor – which was less centralized than the malaria network but more than the HIV network. Unlike the other cases, the child health provision network remained as centralized as its interaction counterpart (0.252) but the request network became less centralized (0.131). Considering density and centralization together as network closure, this network was relatively closed, ensuring efficient coordination by a small group of actors.

While we hypothesized that complex knowledge was more likely to be adopted in a dense network, the findings indicate that complex knowledge was used, but not in ways expected. Despite the high density compared to the other cases of malaria and HIV, evidence was used symbolically in the child health case. The density observed in the child health networks, particularly the evidence provision network, was largely due to strategic efforts of IO partners to disseminate evidence in order to persuade health bureaucrats and policy elites. Thus, while the multiple ties ensured the saturation of evidence in the network, this evidence was ultimately used to justify the pre-determined position of funders and IO partners. Our hypothesis relating closure to innovativeness was correct: high network closure reinforced the position of those in control (i.e., the funders) at the expense of innovation.

Actors in the child health network came from 11 distinct organizations, and 38% of interaction ties spanned 'types' of organizations. Despite the participation of IOs in the grant writing process, the network data suggested that policy actors remained somewhat segmented according to organizational type,

with a greater likelihood of interacting with peers from within than with those from other organizations (see Figure 1a). The evidence provision network was actually more heterogeneous than the interaction network, consistent with the strategic role of IO partners in disseminating (providing) evidence to government colleagues. Overall, this case was not particularly exposed to outside actors and ideas, instead demonstrating high levels of network closure. Our data suggest that control and cohesion attained by the network structure led to the passage of a policy that was not highly innovative or informed by evidence, but was the preference of funders and international actors.

Insert Figure 1a here

Malaria

The notable features of the malaria interaction network are its centralization and heterogeneity (see Table 1a). Nearly 60% of ties were received or sent by a single actor, consistent with the strong leadership from the National Malaria Control Programme over this policy process. Despite the network's centralization around a single actor, 86% of the ties crossed organizational types, reflective of the participation of civil society organizations in the grant writing process and the many ties between government and civil society. The evidence provision and request networks were far less dense than their child health counterparts. Very few evidence provision ties existed for malaria (density: 0.041) and even fewer request ties (density: 0.029). Of the provision ties that did exist,

they were relatively effective at spanning types of organizations but the request ties were largely confined to same organizational types, suggesting that geographic or physical distance is not the only barrier at play, but that some other factor – perhaps fear of losing professional status, or of becoming indebted to others – makes the request of evidence less likely than its provision. Overall, the malaria evidence networks were far less heterogeneous than the interaction network for that case.

The malaria networks displayed high levels of centralized control at the same time as high levels of heterogeneity, suggesting that this community could access social capital embedded in external networks and then take advantage of it through a cohesive internal network. The result was a relatively innovative policy idea whose implementation depended on new actors, along with the consistent, conceptual use of evidence to inform the idea.

Insert Figure 1b here

HIV

The HIV network was found to be the most decentralized (Table 1a), consistent with qualitative interview data. It was also relatively diverse, perhaps owing to the on-going advocacy between civil society representatives and government policy elites. Despite its heterogeneity, Figure 1c shows a high level of distinct network sub-groups, with civil society and government actors on very different sides of the network, consistent with the fact that they represented

different sides of the policy issue. The HIV evidence provision network is also relatively heterogeneous, suggesting that cross-organization exchanges extended to evidence provision (Table 2b). As in the other cases, the request network was significantly less dense than the provision network and far less heterogeneous (see Tables 2b-c).

The decentralized and sparse HIV network allowed for new ideas to percolate and be tested among its actors. Its low closure facilitated the entry of new actors and their policy solutions. Because there were multiple loci of authority, the change process was contentious and long, but ultimately resulted in significant policy change.

Insert Figure 1c here

Cross-case comparison

Common themes emerge from the comparisons of network structure. Across all cases, networks of interaction relations were much denser than the same actors' networks of evidence provision and request relations. Evidence request networks were consistently the least dense, suggesting that actors are far more likely to provide, rather than request, research evidence. In general, this points to evidence exchange relationships that are largely hierarchical, with evidence provision occurring in the absence of its request (Shearer 2013b). The child health networks were densest for all relations, explained in part by procedural aspects (many meetings in a short period of time) but also by the

strategic behaviour of IOs to actively engage government actors, and importantly, to share evidence with them (Figure 1a). Considered together, these data suggest that ties in the child health network were largely formed with the aim of evidence exchange (and use), reversing the expected causal relationship between structure and outcomes.

We anticipated that dense networks would facilitate the exchange, and thus utilization of sets of complex ideas. Our findings seem to run in the opposite direction (see Table 2). Evidence had an opportunity to spread and be called upon in the networks with lower density (malaria and HIV). This is consistent with observations that link low density, and thus fewer redundant ties, to more efficient information diffusion – although these findings are typical of basic information as opposed to complex information (Reagans, McEvily 2003). Our findings support observations that ideas will only be adopted if they are consistent with the network's dominant paradigm, and that the more closed the network, the more resistant it is to challenges to its paradigm. In this regard we might expect dense network to use evidence symbolically to justify their pre-determined positions, and more instrumental uses from networks that are more open to new ideas and willing to take political risks.

Centralization scores behaved differently than density results. The child health network became no less centralized moving from interaction to evidence provision ties, suggesting that the same few actors exerted control over both interactions and evidence provision. The malaria network, whose process was highly centralized around the National Malaria Control Programme, lost its

centralization in the evidence exchange networks. This represents a missed opportunity for the policy leader to disseminate and exchange research evidence. We expected centralization to be negatively associated with evidence use, and it was for the decentralized HIV network. However the other two cases seemed to operate in opposite directions: malaria was highly centralized yet used evidence conceptually and child health was moderately decentralized but used evidence symbolically. Similar to arguments above regarding the cohesiveness of network paradigms, decentralization likely allows a plurality of ideas to exist and be called upon. Centralization around a strong leader will enable the use of evidence so long as it is consistent with the network paradigm whereas the spread and adoption of new ideas will be possibly only in circumstances of decentralized power and control.

As predicted, innovation was generally more likely to occur in open network structures – structures with low density and low centralization. The closed child health network demonstrated minimal innovation while the more open malaria and HIV networks were more innovative. The malaria network showed that a network could be highly centralized but also open. This likely depends on the policy preferences of the central actors and the wider policy context. While control of the process was centralized in one actor, the process itself was open to participation from a wide variety of actors who had relatively sparse connections to other throughout the network, enabling the entrance of new ideas. Innovation requires taking a political risk, and in this case the central actor was supportive of the new idea and willing to accept the risk inherent in

innovating. It helps that, as in the child health case, much of the actual costs of innovating could be transferred to the external funders.

Network heterogeneity seemed to decrease when moving from interaction, to evidence provision, to evidence request (except in the case of child health). This general trend is consistent with previous findings that complex information is more likely to be exchanged between actors who are physically and cognitively proximate (Reagans, McEvily 2003). The extreme lack of heterogeneity in malaria and HIV request networks was startling, suggesting that barriers to interacting with actors in other organizations are easier to surmount for basic interactions than for complex processes such as knowledge transfer. Taking research evidence as a form of political capital, its request would involve higher costs than its provision (Borgatti 2003). This trend was not observed for child health where concerted efforts by IO actors to disseminate evidence actually increased (evidence provision) or maintained (evidence request) heterogeneity in comparison to interaction ties.

Our hypotheses linking greater heterogeneity to evidence use and innovativeness were generally correct, suggesting that exposure to outside networks increase exposure to, and adoption of, new ideas. Our interview data bear out this association: respondents suggested that the broad, national scale-up and contractualization of the malaria programme was only possible with the participation of civil society actors; and the HIV policy change was due in large part to advocacy by civil society groups. In these cases, innovative policy ideas seemed to emerge from diverse actors. In the case of evidence use, the

relationship is more complex. Whereas evidence use and heterogeneity were positively associated, it is not clear whether diverse actors enter on the tail of new ideas (new ideas lead to heterogeneity), whether the existence of diverse actors results in the introduction of new ideas, or whether new ideas are always percolating in networks but can only gain traction when the environment supports their use as political capital in bargaining. The HIV case tends to support the latter supposition, where a heterogeneous and decentralized network enabled the highly efficient spread and use of disruptive evidence. Although the malaria network was even more heterogeneous, its policy environment did not need evidence in the same way as the HIV network, with a control centre highly supportive of the proposed change. Conversely, the bifurcation of ideas and positions in the HIV network, typical of its decentralization, may have been overcome by the instrumental use of evidence.

Discussion and Implications

Our study found that network structure was associated with policy process outcomes – evidence use and innovativeness – across three policy cases in Burkina Faso. Further, we found that multiple levels of network relations could be analysed in the same study, adding depth and perspective to actors’ networks in policy-making and their outcomes. We were successful in operationalizing a comparative case study of policy networks in a low-income country, demonstrating that these types of explorations are not only feasible, but also useful in informing the high stakes games of policy-making in these contexts.

These findings have implications for policy research and practice in low-income countries and beyond.

Our findings confirm previous observations that network structure matters (Howlett 2002, Sandstrom, Carlsson 2008). Specifically, we found that networks with many connections between diverse sets of actors were more likely to use evidence and to innovate. This finding is consistent with Howlett's (2002) claim that policy change requires new actors and new ideas, and extends non-network findings of the importance of interpersonal relationships between diverse actors to the network context (Lavis 2005). If policy-makers or those who support policy processes are interested in supporting evidence use and innovation during policy-making, they would be wise to consider amplifying the heterogeneity in a network by adding new actors from diverse backgrounds and finding ways for them to interact with other network actors. These processes will increase the number of heterogeneous ties, thus leading to greater exposure to research evidence and innovative ideas. However, exposure does not equal adoption. While exposure to ideas is a necessary condition for innovation and evidence use, those ideas will either falter or thrive based on a network's internal environment, as measured by closure.

We found that different internal network conditions were associated with different types of evidence use. Symbolic use was most likely in the highly closed and cohesive child health network, whereas instrumental use occurred only in the highly decentralized HIV network, helping to resolve that network's battle over ideas and sides of the issue. Hypotheses related to innovation and closure were

similar: innovation, by definition, challenges the status quo and thus networks characterized by high closure and cohesion will typically lack the incentives for innovation. That the highly centralized (and thus cohesive) malaria network adopted an innovative policy solution can be explained by the role of external funding in subsidizing the costs of innovation by shifting political risk. The implications of these findings are twofold. First, creating networks that facilitate exposure to evidence or new ideas is not enough for them to be adopted; the latter process requires a supportive internal network. While it is more difficult to alter a network's internal environment (new actors are added to the margins of a network), it is possible through targeted advocacy to central, powerful actors, or changing the incentives and costs associated with the adoption of new ideas. Second, the resulting internal network may facilitate certain types of evidence use as observed in this study, and thus care should be taken to consider the repercussions of inputs that affect network cohesiveness and closure.

The observations regarding research use raised questions of causality. It has been assumed that network structure *causes* network outcomes. In the case of the child health and HIV networks, data suggest that network structure was largely *created* by evidence exchanges between actors. These findings confirm that evidence can act as a form of social capital in policy networks and can be used strategically to form relationships or gain access to networks. This finding is consistent with observations from other settings (Teichman 2004, Weyland 2005) (Teichman 2004;Weyland 2005, 262) (Teichman 2004;Weyland 2005, 262)and not surprising in a wider development context of technocratic policy-

making and information asymmetries (Teichman 2004, Weyland 2005). Thus, efforts to train national policy actors in the interpretation and application of scientific evidence should be strengthened.

Our study explored network structure using three different relations and found that the general shape of the network did not vary tremendously between these relations in a given case. However, network density declined dramatically from interaction, to evidence provision, to evidence request. The request networks were extremely sparse, signalling almost no request of evidence in this context. Further, heterogeneity fell for each relation, suggesting that even if actors do request evidence, they are unlikely to do so across organizational boundaries. This has implications for knowledge transfer strategies in this context and deserves further research to understand the barriers to requesting evidence, particularly from outside of one's organization. We imagine this has something to do with the perceived political or social costs of asking for another's assistance (e.g., interpersonal risk or obligations incurred (Borgatti 2003)), which are likely very different than the calculations for providing assistance – a net gain in political or social capital for the provider.

Strengths and limitations

The findings of this study bear testing in other low-income countries. This study is limited by its small sample of three policy networks. Internal validity is challenged by our choice to capture the entire policy process in one network snapshot, whereas in reality the network structure likely shifted throughout the decision process. This issue of network dynamics was dealt with in part by our

use of qualitative data to fully understand the ecology of these networks during these processes, and points to the necessary inclusion of mixed methods in network studies. The act of coding the dependent variables was challenging, as noted by others (Contandriopoulos et al. 2010), and was compounded by the role played by funders and grant conditionalities. While we considered these variables to be of interest, there is certainly a need for other outcomes to be measured against network structure with an eye to supporting effective policy-making. There is also a need to explore the extent to which networks are intentionally, or strategically, structured by certain actors. Our interview questions did not capture this concept and we cannot speculate on the extent to which funders, for example, understood the effect of their procedural rules on network structure and thus function.

Implications for policy-making

A better understanding of how structure affects outcomes can be harnessed to improve policy-making processes and their outcomes for the betterment of populations. For example, our study suggests that greater actor heterogeneity will increase the likelihood of exposure to and adoption of new evidence and new policy innovations. Connecting existing policy networks to new networks of thinkers may encourage new ways of thinking. We observed a particularly strong effect of policy learning from neighbouring countries and regions, pointing to the importance of choosing the ‘right’ external networks. Opening up internal networks to new actors will also lessen incentives to maintain the status quo by shifting risk and responsibility to others. This can be achieved by decentralizing

certain procedural activities to sub-groups in the network, or by joining existing networks together to achieve more decentralized, sparser, and diverse networks. We observed the effect of funders' rules and conditions on network structure (see Chapter 1 of this Thesis for a more detailed account) but the same outcomes could be achieved through endogenous network management or leadership from within.

References

- Atkinson, M.M. & Coleman, W.D. 1992, "Policy Networks, Policy Communities and the Problems of Governance", *Governance*, vol. 5, no. 2, pp. 154-180.
- Beyer, J.M. & Trice, H., M. 1982, "The Utilization Process: A Conceptual Framework and Synthesis of Empirical Findings", *Administrative Science Quarterly*, vol. 27, no. 4, pp. 591-622.
- Borgatti, S.P. 2003, "A relational view of information seeking and learning in social networks", *Management science*, vol. 49, no. 4, pp. 432.
- Bryce, J., el Arifeen, S., Pariyo, G., Lanata, C., Gwatkin, D., Habicht, J.P. & Multi-Country Evaluation of IMCI Study Group 2003, "Reducing child mortality: can public health deliver?", *Lancet*, vol. 362, no. 9378, pp. 159-164.
- Buchanan, D., Shaw, S., Ford, A. & Singer, M. 2003, "Empirical science meets moral panic: an analysis of the politics of needle exchange", *Journal of public health policy*, vol. 24, no. 3-4, pp. 427-444.
- Burt, R. 2004, "Structural Holes and Good Ideas", *American Journal of Sociology*, vol. 110, no. 2, pp. 349-399.
- Buskens, V. 2002, *Social Networks and Trust*, Kluwer Academic Publishers, Boston.
- CMLS-Santé 2009, *Note technique de la gratuité des ARV au Burkina Faso*, Ministère de la Santé, Ouagadougou.
- Coleman, W.D. & Skogstad, G.D. 1990, "Policy communities and policy networks: a structural approach" in *Policy communities and public policy in Canada* Copp Clark Pittman, , pp. 14-33.
- Coleman, W.D., Skogstad, G.D. & Atkinson, M.M. 1996, "Paradigm Shifts and Policy Networks: Cumulative Change in Agriculture", *Journal of Public Policy*, vol. 16, no. 3, pp. 273-301.
- Considine, M. & Lewis, J.M. 2007, "Innovation and Innovators Inside Government: From Institutions to Networks", *Governance*, vol. 20, no. 4, pp. 581-607.
- Contandriopoulos, D., Lemire, M., Denis, J.L. & Tremblay, E. 2010, "Knowledge exchange processes in organizations and policy arenas: a narrative systematic review of the literature", *The Milbank quarterly*, vol. 88, no. 4, pp. 444-483.
- Corwin, R.G. & Louis, K.S. 1982, "Organizational barriers to the utilization of research", *Administrative Science Quarterly*, vol. 27, no. 4, pp. 623.
- Derme, S. 2007, *Avis technique sur les couts de la prise en charge medicale des PVVIH*, République du Burkina Faso, Ouagadougou.

- Deshpande, R.Z.,G. 1982, "Factors affecting the use of market research information: a path analysis", *Journal of Marketing Research*, vol. 19, no. 1, pp. 14.
- Freeman, L.C. 1979, "Centrality in social networks conceptual clarification", *Social Networks*, vol. 1, no. 3, pp. 215.
- Gerring, J. 2004, "What is a case study and what is it good for?", *American Political Science Review*, vol. 98, no. 2, pp. 341.
- Hall, P.A. 1993, "Policy paradigms, social learning, and the state: the case of economic policymaking in Britain", *Comparative politics*, vol. 25, no. 3, pp. 275.
- Hansen, M.T. 2002, "Knowledge networks: Explaining effective knowledge sharing in multiunit companies", *Organization Science*, vol. 13, no. 3, pp. 232.
- Howlett, M. 2002, "Do Networks Matter? Linking Policy Network Structure to Policy Outcomes: Evidence from Four Canadian Policy Sectors 1990-2000", *Canadian Journal of Political Science/Revue canadienne de science politique*, vol. 35, no. 02, pp. 235.
- Hyden, G. 2006, *African politics in comparative perspective*, Cambridge University Press, Cambridge.
- Inkpen, A.C. & Tsang, E.W.K. 2005, "Social capital, networks, and knowledge transfer", *Academy of management review*, vol. 30, no. 1, pp. 146-165.
- Innvaer, S. 2002, "Health policy-makers' perceptions of their use of evidence: a systematic review", *Journal of Health Services Research Policy*, vol. 7, no. 4, pp. 239.
- Jones, G., Steketee, R.W., Black, R.E., Bhutta, Z.A., Morris, S.S. & Bellagio Child Survival Study Group 2003, "How many child deaths can we prevent this year?", *Lancet*, vol. 362, no. 9377, pp. 65-71.
- Knoke, D. 1990, *Political networks: the structural perspective*, Cambridge University Press, Cambridge ; New York.
- Knoke, D. & Yang, S. 2008, *Social Network Analysis*, Second edn, SAGE Publications, Thousand Oaks, CA.
- Kouanda, S., Bocoum, F.Y., Doulogou, B., Bila, B., Yameogo, M., Sanou, M.J., Sawadogo, M., Sondo, B., Msellati, P. & Desclaux, A. 2010, "User fees and access to ARV treatment for persons living with HIV/AIDS: implementation and challenges in Burkina Faso, a limited-resource country", *AIDS Care*, vol. 22, no. 9, pp. 1146-1152.
- Lavis, J. 2005, "Towards systematic reviews that inform health care management and policy-making", *Journal of Health Services Research Policy*, vol. 10, no. Supplement 1, pp. 35.

Ph.D. Thesis – J. Shearer; McMaster University – Health Policy

- Lavis, J.N., Posada, F.B., Haines, A. & Osei, E. 2004, "Use of research to inform public policymaking", *Lancet*, vol. 364, pp. 1615-21.
- Lazer, D. 2011, "Networks in Political Science: Back to the Future", *PS, political science politics*, vol. 44, no. 01, pp. 61.
- Lewis, J.M. 2006, "Being around and knowing the players: Networks of influence in health policy", *Social science & medicine*, vol. 62, no. 9, pp. 2125-2136.
- Lin, N. 1999, "Building a network theory of social capital", *Connections*, vol. 22, no. 1, pp. 28-51.
- Lubell, M., Scholz, J., Berardo, R. & Robins, G. 2012, "Testing Policy Theory with Statistical Models of Networks", *Policy Studies Journal*, vol. 40, no. 3, pp. 351-374.
- Marsh, D. 1998, *Comparing policy networks*, Open University Press, Buckingham, England.
- Marsh, D. & Smith, M. 2000, "Understanding Policy Networks: towards a Dialectical Approach", *Political Studies*, vol. 48, no. 1, pp. 4-21.
- Mathews, J. 1997, "Power Shift", *Foreign Affairs*, , pp. 50-66.
- Mintrom, M. 1998, "Policy networks and innovation diffusion: The case of state education reforms", *The Journal of politics*, vol. 60, no. 01, pp. 126.
- Program in Policy Decision-making 2013, , *Evaluating knowledge-translation platforms in low- and middle-income countries* [Homepage of McMaster University], [Online]. Available: <http://www.researchtopolicy.ca/KTPEs/KTPE-overview> [2013, 11/05].
- Provan, K.G. & Milward, H.B. 1995, "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems", *Administrative Science Quarterly*, vol. 40, no. 1, pp. 1-33.
- Radaelli, C.M. 1999, "The public policy of the European Union: whither politics of expertise?", *Journal of European public policy*, vol. 6, no. 5, pp. 757.
- Reagans, R. & McEvily, B. 2003, "Network Structures and Knowledge Transfer: The Effects of Cohesion and Range", *Administrative Science Quarterly*, vol. 48, no. 2, pp. 240-267.
- Ridde, V., Richard, F., Bicaba, A., Queuille, L. & Conombo, G. 2011, "The national subsidy for deliveries and emergency obstetric care in Burkina Faso", *Health policy and planning*, vol. 26 Suppl 2, pp. ii30-40.
- Rogers, E.M. 2003, *Diffusion of innovations*, 5th edn, Free Press, New York.

Ph.D. Thesis – J. Shearer; McMaster University – Health Policy

- Rogers, E.M. & Shoemaker, F.F. 1971, *Communication of innovations; a cross-cultural approach*, 2d ed. edn, Free Press, New York,.
- Sandstrom, A. & Carlsson, L. 2008, "The Performance of Policy Networks: The Relation between Network Structure and Network Performance", *Policy Studies Journal*, vol. 36, no. 4, pp. 497-524.
- Seawright, J. & Gerring, J. 2008, "Case Selection Techniques in Case Study Research", *Political Research Quarterly*, vol. 61, no. 2, pp. 294.
- Shearer, J.C. 2013a, *Chapter 2: The interaction of policy networks with institutions, interests and ideas in three health policy cases in Burkina Faso*, Ph.D. edn, McMaster University, Hamilton, ON.
- Shearer, J.C. 2013b, *Chapter 4: Determinants of exchange and use of research evidence in health policy networks*, Ph.D. edn, McMaster University, Hamilton, ON.
- Sirima, S.B., Tiono, A.B., Gansane, A., Diarra, A., Ouedraogo, A., Konate, A.T., Kiechel, J.R., Morgan, C.C., Olliaro, P.L. & Taylor, W.R. 2009, "The efficacy and safety of a new fixed-dose combination of amodiaquine and artesunate in young African children with acute uncomplicated Plasmodium falciparum", *Malaria journal*, vol. 8, pp. 48.
- Stone, D. 2008, "Global Public Policy, Transnational Policy Communities, and Their Networks", *Policy Studies Journal*, vol. 36, no. 1, pp. 19-38.
- Teichman, J. 2004, "The World Bank and Policy Reform in Mexico and Argentina", *Latin American Politics and Society*, vol. 46, no. 1, pp. 39-74.
- Tiono, A.B., Kabore, Y., Traore, A., Convelbo, N., Pagnoni, F. & Sirima, S.B. 2008, "Implementation of Home based management of malaria in children reduces the work load for peripheral health facilities in a rural district of Burkina Faso", *Malaria journal*, vol. 7, pp. 201.
- Tsebelis, G. 1995, "Decision Making in Political Systems: Veto Players in Presidentialism, Parliamentarism, Multicameralism and Multipartyism", *British Journal of Political Science*, vol. 25, no. 3, pp. 289-325.
- UNICEF 2005, *Final report to CIDA: Accelerating child survival and development*. UNICEF WCARO, Dakar, Senegal.
- Weiss, C.H. 1979, "The many meanings of research utilization", *Public administration review*, vol. 39, no. 5, pp. 426.
- Weyland, K.G. 2005, "Theories of policy diffusion: lessons from Latin American pension reform", *World Politics*, vol. 57, no. 2, pp. 262.
- WHO 2004, *World report on knowledge for better health*, World Health Organization, Geneva.

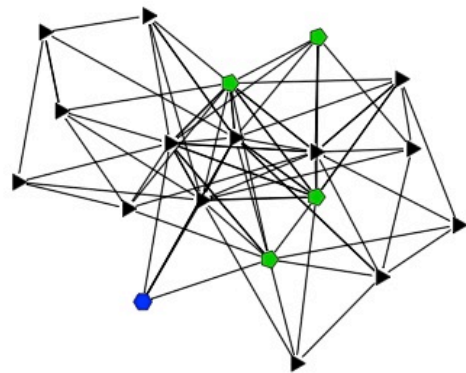
Woelk, G., Daniels, K., Cliff, J., Lewin, S., Sevene, E., Fernandes, B., Mariano, A., Matinhure, S., Oxman, A., Lavis, J. & Lundborg, C. 2009, "Translating research into policy: lessons learned from eclampsia treatment and malaria control in three southern African countries", *Health research policy and systems*, vol. 7, pp. 31-31.

World Health Organization and United Nations Children Fund 2004, *WHO/UNICEF Joint Statement: Management of Pneumonia in Community Settings*, World Health Organization and Unicef, Geneva/New York.

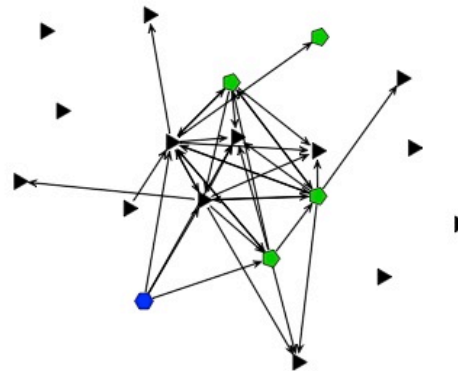
Yin, R.K. 1999, "Enhancing the quality of case studies in health services research", *Health services research*, vol. 34, no. 5 Pt 2, pp. 1209-1224.

Figure 1: Networks coded by organization type

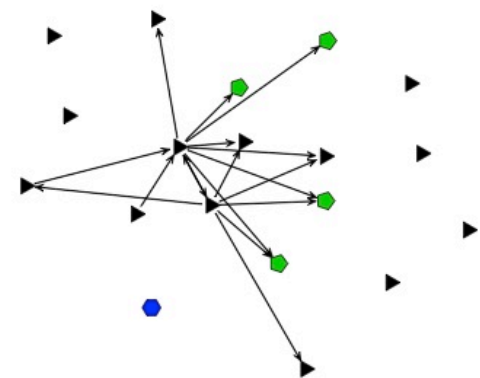
Figure 1a: Child health networks



i. Interaction



ii. Evidence provision



iii. Evidence request

Figure 1b. Malaria networks

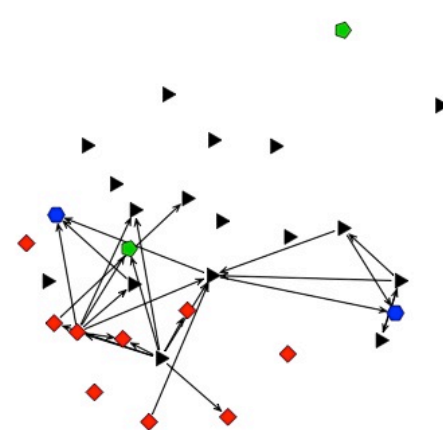
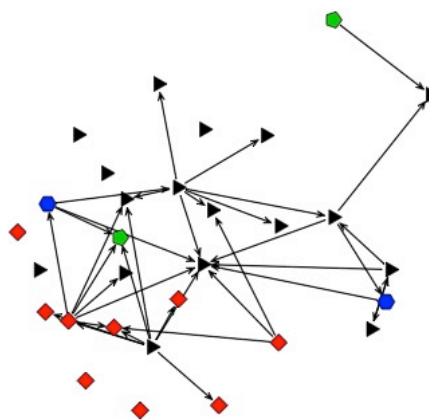
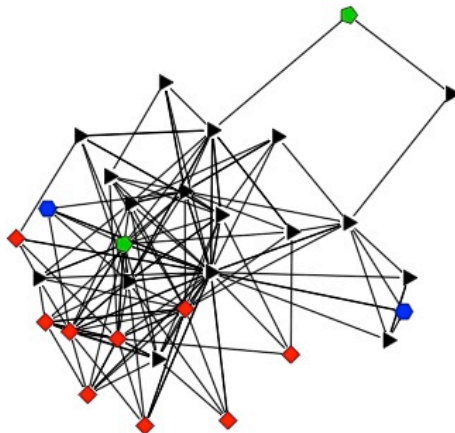
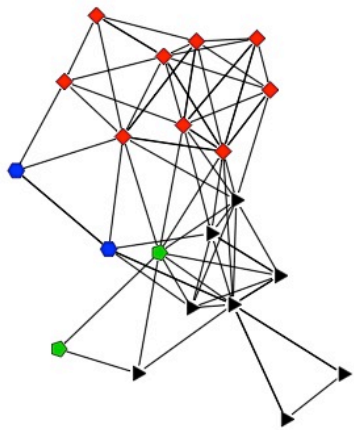
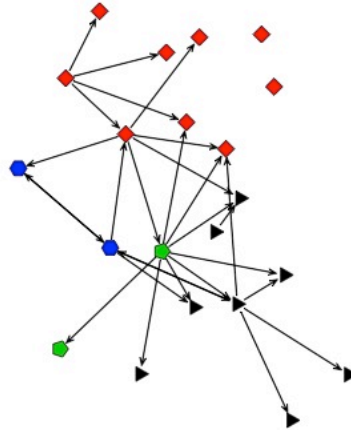


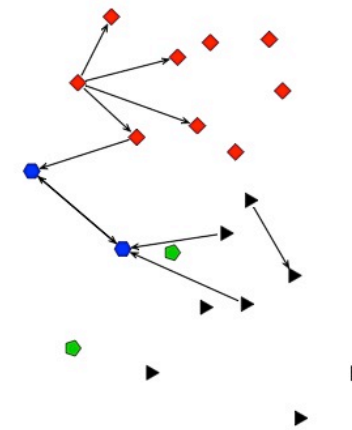
Figure 1c. HIV networks



i. Interaction



ii. Evidence provision



iii. Evidence request

Figure 1 legend

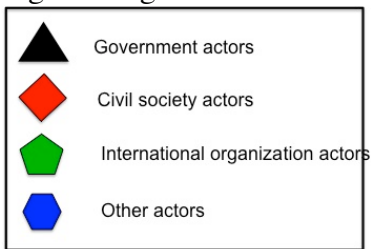


Table 1: Summary of networks and their dependent variables

Policy Network	Distinguishing features of the process	Research use (ranked)	Innovativeness (ranked)
Child health	<ul style="list-style-type: none"> • Process initiated by a funding opportunity to introduce community-based treatment of childhood illnesses • Disagreement between MoH and funder/IOs as to whether pneumonia treatment should be included • UNICEF introduced published research studies and experiences of other countries to build case for pneumonia treatment • Health bureaucrat was convinced of pneumonia success at regional meeting and communicated lessons to colleagues • Funders mandated inclusion of pneumonia; pneumonia was added as small-scale pilot 	<p>(3) <u>Symbolic</u> use by IOs/Funder</p> <p><u>Conceptual</u> use by health bureaucrats, but decision ultimately mandated by funder</p>	<p>(3) <u>Change in instruments</u> (but mandated by funders)</p>
Malaria	<ul style="list-style-type: none"> • Process initiated as part of funding opportunity; funders mandated participation of civil society partners in grant-writing. • New programme built on existing community-based malaria treatment programme, 	<p>(2) <u>Conceptual</u> use</p>	<p>(1) <u>New policy instrument</u>: contracting-out of programme implementation to civil society partners</p>

	<p>with new drug and new implementation strategy.</p> <ul style="list-style-type: none"> • Active malaria research institutions and strong history of home management research meant high awareness of evidence among health bureaucrats and researchers. 		
HIV	<ul style="list-style-type: none"> • Years of advocacy by civil society to remove user fees for <i>all</i> HIV patients, in contrast to ideology of individual responsibility held by policy elites. • CSOs stopped charging patients user fees; this practice was measured and reported. • Change in Minister of Health initiated additional technical notes on the issue. 	(1) <u>Instrumental use</u>	(2) <u>Change in settings of policy instrument:</u> indigence exemption extended to entire population for first time

Table 2a: Network structural characteristics: interaction network

	Closure			Heterogeneity	
	Actors	Density	Centralization	Diversity ¹	Cross-boundary ²
Child health	19	0.398 (1)*	0.300 (2)	11	0.380 (3)
Malaria	30	0.276 (3)	0.591 (1)	18	0.862 (1)
HIV	21	0.3 (2)	0.221 (3)	16	0.698 (2)

1. Number of different organizations represented in the network
2. Proportion of network ties that crossed organizational types (government; international organizations; civil society organizations; other)

* Numbers in brackets represent ranks

Table 2b: Network structural characteristics: evidence provision network

	Closure			Heterogeneity	
	Actors (n)	Density	Centralization	Diversity ¹	Cross-boundary ²
Child health	19	0.108 (1)	0.252 (1)	7	0.484 (3)
Malaria	30	0.041 (3)	0.251 (2)	14	0.665 (1)
HIV	21	0.070 (2)	0.092 (3)	13	0.485 (2)

Table 2c: Network structural characteristics: evidence request network

	Closure			Heterogeneity	
	Actors (n)	Density	Centralization	Diversity ¹	Cross-boundary ²
Child health	19	0.050	0.131	7	0.343
Malaria	30	0.029	0.154	11	0.076
HIV	21	0.024	0.139	7	0.001

Chapter 4: Determinants of exchange and use of research evidence in health policy networks

Abstract

Background

Research evidence is considered an important input into health policy-making, but its actual use in policy-making is limited. It is known that evidence is more likely to be used by policy-makers if they have interpersonal relationships with researchers. Applying a social network analysis lens to this problem, we hypothesize that the exchange and use of research evidence in policy-making will be highly informed by the structure of policy actors' social networks. This study aims to identify factors associated with the exchange of research evidence between health policy actors, and how those exchanges are associated with evidence use in policy-making.

Methods and Findings

This study uses social network analysis approaches to understand evidence exchange and use. Data on respondents' social networks, demographics and perceptions about the policy cases were collected from policy actors in three health policy domains in Burkina Faso. Exponential random graph models were used to estimate the probability of evidence exchange (research evidence provision and request) between actors, controlling for network- and individual-level covariates. Network and individual-level covariates were then incorporated

in logistic regression models to estimate actors' use of research evidence to inform policy.

Network structure explained more than half of the evidence exchanges observed in these networks. A pair of actors were more likely to provide evidence if they were already engaged in requesting evidence from each other. The child health network displayed clustering tendencies, meaning that ties were more likely to form between actors if they shared a common acquaintance. Actors' use of research evidence to inform their decisions during policy-making was positively associated with how many times they exchanged evidence.

Conclusions

The exchange and use of research evidence in policy-making can be partly explained by the structure of actors' networks of relationships. Effective efforts to support knowledge translation and evidence-informed policy-making must consider network factors.

Introduction

The use of research evidence to inform health policy decision-making has been identified as a means to improve the effectiveness of health policy decisions (WHO 2004b, WHO 2004a, Lavis et al. 2006) but evidence-informed policy-making occurs infrequently in practice for a variety of reasons (Lavis et al. 2006). Within the growing body of literature identifying facilitators of evidence use in policy-making (Lavis et al. 2006, Mitton et al. 2007, Lavis 2009, Oxman et al. 2009, Contandriopoulos et al. 2010), interpersonal relationships between researchers and policy-makers appear to play an important role (Lavis et al. 2002, Lomas 2007, Contandriopoulos et al. 2010). This is consistent with a social network lens, which argues that behaviours can be explained by an individual's relationships with others and their location in their larger social structure. This study aims to answer two research questions in order to illuminate the continuum of evidence exchange and use in health policy-making: first, what factors are associated with research exchange relationships between policy actors; and second, to what extent are these exchange relationships associated with the use of research evidence by policy actors in the policy-making process? These results will have important implications for the design of interventions for knowledge translation and evidence-informed policy-making.

Social network analysis

Social network analysis (SNA) provides a theoretical lens and analytic tools for exploring behaviours that are socially influenced. SNA has been used to

describe the effect of network structure on knowledge transfer within organizations (Hansen 2002, Reagans, McEvily 2003, Borgatti 2003, Levin, Cross 2004, Inkpen, Tsang 2005), but less so in policy networks, defined in this study as sets of individuals who interact on a given policy issue. Earlier work in this field has successfully mapped network structure (i.e., actors and their ties to each other) and has used structural differences to explain outcomes of policy processes (Marsh 1998, Howlett 2002, Kriesi, Adam & Jochum 2006, Sandstrom, Carlsson 2008). Recent methodological innovations enable the prediction of ties between pairs of actors in order to understand why some actors engage with others, and how their connections are influenced by some function of their individual attributes and network structure. These models are referred to as the exponential random graph class of models (ERGM) (Wasserman, Pattison 1996, Robins 2007). The present chapter uses ERGMs to model the existence of research evidence exchange ties, specifically evidence provision and request, in a policy network.

Ties can form, in theory, between any two individuals. But in practice, network scientists observe more frequent tie formation in the presence of certain network structures. This section presents common network hypotheses adjusted to the context of Burkina Faso (see Table 1 for a synthesis), where, as in many low-income countries, the formal culture of research production, access and use is relatively weak due to language barriers, poor Internet access, and general resource limitations (Kouyate et al. 2007, Dagenais, Queuille & Ridde 2013). A

better understanding of interpersonal modes of exchange will be highly relevant for low-income countries.

Insert Table 1 here

First, individuals are more likely than chance alone to form ties with other individuals if they have a friend in common. This phenomenon is referred to as “network closure” and looks like a closed triangle between three actors on a network graph (see Table 1). In the policy science and governance literature, closure is associated with stronger group cohesion, cooperation, and shared norms (Burt 2004, Robins, Lewis & Wang 2012, Lubell et al. 2012). Further, a propensity for closure limits what Burt (2004) described as “structural holes” in a network; that is, the areas of a network where actors are relatively unconnected. It is the bridging of these structural holes that is associated with the efficient diffusion of innovations and new ideas (Burt 2004). We expect to observe a positive association between network closure and tie formation in evidence exchange networks with cohesive cognitive paradigms. A network with a tendency for closure will likely exchange ideas that reinforce the status quo, but will limit the introduction and exchange of new ideas. In this context, such networks are likely to be either dominated by powerful policy elites or international actors.

Reciprocity is another social process that is frequently observed more often than chance alone (Goodreau, Kitts & Morris 2009, Robins, Lewis & Wang

2012). For example, a request for evidence from Person A to Person B is reciprocated when Person B requests evidence from Person A (see Table 1). Networks with high reciprocity are considered “flat,” or non-hierarchical, governance structures (Jones, Hesterly & Borgatti 1997). An evidence exchange network with high reciprocity would indicate that its actors have relatively similar levels of expertise, access to and demand for evidence, and the political capital to exchange it with each other. In contrast, policy actors in Burkina Faso have varying levels of capacity for finding and using research evidence and the policy-making culture is hierarchical, with power and expertise centralized among certain few actors. For these reasons, we do not expect to observe a positive association between reciprocity and tie formation in these networks.

Entrainment is the other side of the coin. Instead of measuring the existence of two ties for the same relation between a pair of actors, entrainment measures the co-existence of two *different* relations between the same pair of actors (Robins, Lewis & Wang 2012). For example, imagine that Person A requests evidence from Person B. Entrainment occurs when Person B *provides* evidence to Person A (see Table 1). Research exchange networks with high entrainment are achieving their instrumental, or practical, purpose – research is provided when requested – and we suggest that entrainment is an empirical signature of true “exchange” models of knowledge translation (Lomas 2000). A lack of entrainment, for instance when evidence is provided without a request, might indicate the dissemination of research evidence for symbolic or political uses (Weiss 1979), perhaps by development partners or other interest groups keen

to use evidence to justify a policy preference. Likewise, a request for evidence that is ignored suggests limited capacity or limited interest among actors to exchange evidence, and more generally a poor climate for evidence use in policy. We do not expect ties to be returned – or entrained – in this context of lower capacity and demand for research evidence, and higher symbolic and political uses.

In addition to these structural effects, we assume that the individual attributes of actors will influence their propensity to provide or request research evidence. There have been few studies exploring how individual characteristics influence evidence exchange, other than to say that evidence is more likely to be exchanged by a researcher or someone with research experience (Lavis et al. 2002). We hypothesize that in this context, where the culture of research and evidence use is nascent, the provision and request of research evidence will occur more often by actors with research experience, actors with higher employment rank, and development partners. Each of those actor types will have greater resources and technical skills related to finding, exchanging and using research evidence. Higher employment rank and development partners may also signal exposure to larger external networks and thus greater opportunities for exchange.

Finally, the phenomenon of *homophily* specifies that actors are more likely to form ties with ‘like’ individuals (McPherson, Smith-Lovin & Cook 2001). Homophily reduces transaction costs associated with exchanging evidence but limits the wide and efficient dissemination of evidence (Lavis et al. 2002) that would occur if ties connected researchers to non-researchers, crossed

organizational boundaries, and traversed job levels. We expect to observe homophily in these networks.

Methods

Data collection

Social network and demographic data were collected between October 2011 and March 2012 from policy actors active in one or more of three health policy issues in Burkina Faso: community integrated management of childhood illness; home management of malaria; and removal of user fees for antiretroviral treatment for human immunodeficiency virus (HIV); henceforth referred to by their substantive categories: child health; malaria; and HIV. Policy cases were sampled according to pragmatic reasons, including large enough networks to enable statistical analysis, as well as for their diversity on network structural variables of interest. Burkina Faso was chosen as a study country for its participation in knowledge translation activities at the national policy level (Program in Policy Decision-making 2013), as well as for the prevalent social logic of kinship and personal networks in driving behaviours in this setting, as is observed in most Sub-Saharan African countries (Hyden 2006). Burkina Faso is not unlike other Sub-Saharan African countries in terms of level of development, political regime type, and dependence on foreign aid, as well as a health policy sector characterized by participation of diverse actors and frequent changes in institutions. These characteristics will improve the generalizability of results,

contributing to knowledge translation efforts, and evidence-informed policy-making, in other Sub-Saharan African countries.

We defined policy actors as any individual who participated in policy formulation for each policy issue. Actors were identified according to established procedures for respondent-driven censuses of social networks (Knoke, Yang 2008). Beginning with a review of policy documents and informational interviews with key informants, two actors considered to be central in their issue networks were approached for each policy issue. A survey instrument administered by the lead researcher (JS) asked these actors: “With whom did you interact during policy formulation?” generating ‘interaction’ ties. Respondents were encouraged to provide as many names as possible; respondents provided an average of 5 names. They were then asked to specify whether they had: (1) provided research evidence to any of the names they listed (provision ties), or; (2) requested research evidence from any of the names they listed (request ties). Ties were coded as 1 if at least one of the actor-pair reported that a tie existed. Provision and request ties were coded as directed from one actor to another based on each respondents’ reports of their exchanges and could occur in both directions. Provision and request ties could occur simultaneously (i.e., entrainment), but were considered separate constructs, and as such could also exist in the absence of the other. Actors named during the name generating stage were then approached and the same process was carried out for each actor nominated. The procedure was repeated for each issue the respondent participated in. Following other studies of policy networks (Lewis 2006), we chose to cease sampling when a round elicited

fewer new names compared to the previous round. This resulted in four rounds of nominations: most new nominations came during the second and third rounds; the fourth round consisted of 23 of a total of 116 nominations (19.8%) and actors interviewed during the fourth round nominated only 6 new actors. Of 101 actors identified, 69 were reached for an interview. Missing ties were dropped in the analysis.

Data were also collected on actors' relevant individual attributes (see Table 2), including: 'research experience,' defined as any formal experience participating in or leading a research project; 'organization type,' differentiating between actors working for government, development partner organizations, civil society organizations (CSO) and/or non-government organizations (NGO), and others (research organizations or independent consultants); and employment rank, dichotomized into manager/director-level and higher, or not. In-depth interviews elicited respondents' perceptions and understandings of the policy issues and the role of research evidence (Shearer 2013a, Shearer 2013b).

Ethical approval was received from McMaster University's Faculty of Health Sciences Ethical Review Board and the Burkina Faso Ministry of Health Ethics Committee in Health Research. Signed consent was received from all study participants.

Analysis

Step 1: What factors are associated with research exchange relationships?

The probability of a tie existing between any two given actors is modeled using ERGMs, controlling for network structure, or structural effects (SE), and actor characteristics, or attribute effects (AE). Structural effects models (SE models) included parameters for network closure (GWESP),² reciprocity and entrapment. AE models included covariates for researcher experience, organization type, employment rank and homophily. SE and AE models were then aggregated into full models.

Provision and request ties, the dependent variables, were modeled separately for each of the three policy networks, conditional on the existence of an interaction tie. Covariates were added if they improved model fit as tested by Akaike Information Criterion (AIC) and likelihood ratio tests. Data were managed using Microsoft Excel and analyzed in R using the Statnet suite of packages (Handcock et al. 2008b), including ‘ergm’ (Handcock et al. 2008a). Goodness of fit was tested by comparing simulated networks to the observed networks.

Step 2: Are exchange relationships associated with the use of research evidence?

The dependent variable for Step 2 of this study is *evidence use* and was derived from in-depth interviews. A validated scale of evidence use by policy-makers (Knott 1980, Landry, Amara & Lamari 2001) was applied to interview data, assigning each actor a value from 0 (no evidence use) to 5 (“I made efforts to use this research evidence in decisions related to this policy issue”) based on the qualitative analysis of respondents’ discussion of how they used evidence

² Modeled using the *geometrically weighted edgewise shared partner distribution* (GWESP) statistic (Hunter 2007, Goodreau, Kitts & Morris 2009)

during the policy process. Social desirability bias was avoided by indirect lines of questioning that did not suggest that respondents' use of research evidence was being measured. Response validity was achieved through probing strategies and in asking for specific examples or citations if a respondent claimed to have been aware of research on the topic, or to have included evidence in their reports. We hypothesize that an actor's score on the use scale will be positively associated with their "degree," where out-degree counts the number of ties an actor sends and in-degree counts ties received. We expect to see the highest rates of use amongst actors with high out-degree as the active sending of ties suggests positive attitudes related to evidence and its exchange.

To improve model fit, 'evidence use' was collapsed into a binary dependent variable, with the fourth ("reference") and fifth ("effort") categories coded as "use" and all other scale responses coded as "non-use." Logistic regression models tested whether use was associated with each type of degree.

Results

Table 2 describes the networks and their actors. Network composition varied slightly across issues, particularly in terms of organizational affiliation and employment level. Across all issues, provision networks were denser than request networks, meaning that evidence was provided more than requested. The child health networks were the densest and had the highest average degree, indicating that evidence exchange occurred more often for this issue than for the others.

Approximately 13% of actors participated in more than one policy network, as seen by the overlap between policy networks in Figures 1a-b.

[Insert Table 2 here]

[Insert Figures 1a-b here]

Step 1: What factors are associated with research exchange relationships?

The provision and request of research evidence were associated with factors related to both structural and attribute effects. Some covariates did not improve model fit as judged by AIC criteria and were thus excluded. All models converged, avoiding degeneracy problems typical of ERGMs (Handcock et al. 2008b).

Provision models

Models for child health and malaria networks fit best when they combined structural and attribute effects (see Table 3 for full results). HIV models were slightly better fit when only modeling actor attributes. Actors were more likely to form provision ties if they also had a request tie (i.e., entrainment), an effect that was statistically significant across issues and suggests that evidence was exchanged instrumentally. Only the child health network demonstrated a tendency for network closure ($T=2.36$; $OR=10.6$, $p<0.05$). The odds of a provision tie were 10 times greater if that tie closed a triangle between three actors, suggesting that evidence provision may have been used strategically to reinforce a cohesive

paradigm. In the malaria network, the odds of a provision tie were 2.77 times more likely ($T=1.02$; $OR=2.77$, $p<0.05$) if actors had research experience and were half as likely ($T=-0.671$, $OR=0.51$, $p<0.05$) if they worked for a CSO/NGO compared to working for the government. As hypothesized, there was no evidence of reciprocity in any of the issues, suggesting that evidence was provided and requested in a hierarchical manner.

[Insert Table 3 here]

Request models

Request ties were best fit in models combining structural and attribute effects (see Table 4 for full results). Entrainment, or the formation of a request tie where a provision tie already existed and visa versa, remained the strongest predictor of tie formation in these models. Child health again had a significant coefficient for network closure ($T=1.53$; $OR=4.62$, $p<0.05$), meaning that the odds of tie formation were 4.62 times greater if the tie closed a triangle between three actors. Although this coefficient is not as large as in the provision network, request ties still seemed to occur to either strengthen or reinforce cohesion and shared norms in this case. As in the provision models, malaria actors were more likely to have request ties if they had research experience ($T=1.73$; $OR=5.64$, $p<0.05$), suggesting that this policy issue, in particular, had narrowly defined roles for who exchanged evidence. The malaria network demonstrated a significant negative effect of homophily within organizations ($T=-2.24$; $OR=0.11$, $p<0.05$),

meaning that actors were more likely to request research evidence outside of their organizations as compared to within, which runs counter to our hypotheses but presents a picture of interorganizational exchange of evidence for this case. The odds of forming a request tie were 3.36 times higher ($T=1.85$, $OR= p<0.05$) if an actor belonged to the ‘other’ organization category in the HIV network, a category which includes consultants and researchers. This is to be expected in a network that had high representation of CSO/NGO actors, who typically perceived a smaller role for research evidence as compared with lived experiences (Shearer 2013a).

[Insert Table 4 here]

Step 2: Are exchange relationships associated with the use of research evidence?

Forty-three, 34.6 and 31.6 percent of policy actors in child health, malaria and HIV domains, respectively, were coded as having used research evidence during the policy processes to inform their professional decisions. Actively providing evidence was positively associated with the use of evidence across all issues in logit models (see Table 5). Receiving a request for research evidence (in-degree) was associated with use in the malaria domain, and sending a request (out-degree) associated with use in the user-fees domain. The statistical significant of the continuous degree variable suggests a dose-response effect; or, an actor is more likely to use evidence for each additional exchange he/she has. Multivariable models combining actors’ degree and their individual attributes

demonstrated that degree was more predictive of research use than their other attributes.

[Insert Table 5 here]

Discussion

This study illuminated the conditions under which evidence was provided and requested in three policy cases, and confirmed that evidence exchange is closely correlated to its use. Evidence provision and request ties were best predicted by structural factors, particularly entrainment (i.e., actors are more likely to send ties when they complement existing ties), consistent with social network theories of the significant role of networks and structure in predicting individual-level behaviours. Some individual attributes mattered, particularly the role of research experience in the malaria domain, but should not be relied upon to design or target knowledge translation interventions. In terms of evidence use, network position – as judged by connectedness to others – predicted use more than any individual characteristic – not job level, not organizational affiliation, not even experience as a researcher. This finding is consistent with other data that show interpersonal relationships with researchers to be the best predictor of evidence use by policy-makers (Lavis et al. 2004). Taken together, these findings support taking a network lens when designing knowledge translation or evidence-informed policy-making interventions and focusing on strategies that increase an actors' capacity to provide and request evidence.

Despite the progress made in addressing these questions, few findings were consistent across issues, suggesting that the prevalence and mechanisms of research exchange and use is highly issue-dependent. In considering how to design network-based interventions for various settings, we suggest the aphorism: “know your network.” While those who support evidence-informed policy-making interventions may wish for broadly generalizable findings or shortcuts to network mapping, this study suggests that each policy network is unique and must be individually and comprehensively mapped if it is to be leveraged to improve policy or health outcomes.

Findings in relation to our hypotheses

Our findings were generally consistent with our hypotheses and clarify network theories that had not yet been tested in a low-income country policy setting. Only the child health network demonstrated a tendency for network closure. In contrast to previous studies that have associated closure with the limited diffusion of ideas, the child health domain demonstrated the highest density of research provision and request ties and also had the highest proportion of actors who used research evidence to inform their decision-making. On one hand, this finding is consistent with other studies that find the transfer of complex or tacit knowledge is aided by closed, cohesive networks, thus enabling repeated exposure to the evidence (Reagans, McEvily 2003). However, qualitative and whole network data from linked studies clarify that while evidence was exchanged in this network, it was used ‘symbolically’ to justify pre-determined

policy positions of certain actors. The child health policy process advanced as part of a funding proposal process where the funders required that development partners had an equal seat at the table; respondents reported that most research evidence was disseminated strategically by development partners, typically to persuade hesitant government policy-makers (Shearer 2013a, Shearer 2013b). Thus, it is likely that active advocacy and persuasion during this policy process led to the observed network closure as opposed to pre-existing cohesiveness amongst actors in this domain. There is no question that actors can influence the shape of networks and their outcomes (Agranoff, McGuire 2001).

As hypothesized, ties were not reciprocated. Patterns of provision and request were hierarchical and unidirectional. Entrainment between the two relations was observed to a large degree, suggesting that these networks function instrumentally in that research is generally provided only when it is requested, and that most requests are realized. In considering these findings together, one can imagine a hierarchy of evidence flows, where requests flow one way and provisions flow the opposite direction, most often between the same individuals, but rarely will a pair reverse their roles as requesters and providers. Careful analysis of the entrainment finding points to the fact that overall, evidence was provided more often than it was requested. This is consistent with the qualitative interviews where respondents suggested that certain actors, particularly development partners, provided unsolicited evidence (Shearer 2013a).

We observed an absence of homophily, counter to our hypotheses. Homophily covariates did not improve model fit and were thus excluded, except

in the case of the malaria request network where actors were less likely to exchange evidence if they belonged to the same organization. This finding reflects the malaria domain in Burkina Faso, where formal and informal institutional arrangements encourage exchanges between government policy-makers and research organizations. In the child health domain, the strategic dissemination of evidence by development partners overcame tendencies towards homophily.

Strengths and limitations

This study is the first to empirically measure and model evidence exchange in policy networks and provides important insights for evidence use in low-income countries. However, the observed differences across networks highlights the importance of issue-related factors and suggests that these results are not highly generalizable to other policy networks and/or other countries. This study is also limited, as are most social network analyses, by challenges in collecting complete data on whole networks. Missing data may affect our results.

Conclusion

This study explores the exchange and use of research evidence among policy actors in Burkina Faso. It is among the first of its kind to describe structural and attribute-related factors associated with exchange relationships among policy actors. Study findings suggest that while research exchange networks and their outcomes are highly issue-dependent, networks have a significant influence on knowledge exchange and use. Network variables –

including the propensity to send complementary ties, to join sets of three actors, and overall connectedness – were more important than individual characteristics in predicting whether research evidence was provided or requested between actors, and were certainly more important in predicting an actors' use of evidence. These findings can be leveraged to design knowledge transfer interventions which focus on facilitating or reinforcing exchange relationships.

References

- Agranoff, R. & McGuire, M. 2001, "Big Questions in Public Network Management Research", *Journal of Public Administration Research and Theory*, vol. 11, no. 3, pp. 295-326.
- Borgatti, S.P. 2003, "A relational view of information seeking and learning in social networks", *Management science*, vol. 49, no. 4, pp. 432.
- Burt, R. 2004, "Structural Holes and Good Ideas", *American Journal of Sociology*, vol. 110, no. 2, pp. 349-399.
- Contandriopoulos, D., Lemire, M., Denis, J.L. & Tremblay, E. 2010, "Knowledge exchange processes in organizations and policy arenas: a narrative systematic review of the literature", *The Milbank quarterly*, vol. 88, no. 4, pp. 444-483.
- Dagenais, C., Queuille, L. & Ridde, V. 2013, "Evaluation of a knowledge transfer strategy from a user fee exemption program for vulnerable populations in Burkina Faso", *Global health promotion*, vol. 20, no. 1 Suppl, pp. 70-79.
- Goodreau, S.M., Kitts, J.A. & Morris, M. 2009, "Birds of a feather, or friend of a friend? using exponential random graph models to investigate adolescent social networks*", *Demography*, vol. 46, no. 1, pp. 103-125.
- Handcock, M., Hunter, D., Butts, C., Goodreau, S., Krivitsky, P. & Morris, M. 2008a, "ergm: A Package to Fit, Simulate and Diagnose Exponential Family Models for Networks. Version 3.0-999.", *Journal of statistical software*, vol. 24, no. 3.
- Handcock, M.S., Hunter, D.R., Butts, C.T., Goodreau, S.M. & Morris, M. 2008b, "statnet: Software Tools for the Representation, Visualization, Analysis and Simulation of Network Data", *Journal of statistical software*, vol. 24, no. 1, pp. 1548-7660.
- Hansen, M.T. 2002, "Knowledge networks: Explaining effective knowledge sharing in multiunit companies", *Organization Science*, vol. 13, no. 3, pp. 232.
- Howlett, M. 2002, "Do Networks Matter? Linking Policy Network Structure to Policy Outcomes: Evidence from Four Canadian Policy Sectors 1990-2000", *Canadian Journal of Political Science/Revue canadienne de science politique*, vol. 35, no. 02, pp. 235.
- Hyden, G. 2006, *African politics in comparative perspective*, Cambridge University Press, Cambridge ; New York.

- Inkpen, A.C. & Tsang, E.W.K. 2005, "Social capital, networks, and knowledge transfer", *Academy of management review*, vol. 30, no. 1, pp. 146-165.
- Jones, C., Hesterly, W.S. & Borgatti, S.P. 1997, "A General Theory of Network Governance: Exchange Conditions and Social Mechanisms", *The Academy of Management Review*, vol. 22, no. 4, pp. 911-945.
- Knoke, D. & Yang, S. 2008, *Social Network Analysis*, Second edn, SAGE Publications, Thousand Oaks, CA.
- Knott, J. 1980, "If Dissemination Is the Solution, What Is the Problem?", *Science communication*, vol. 1, no. 4, pp. 537.
- Kouyate, B., Sie, A., Ye, M., De Allegri, M. & Muller, O. 2007, "The great failure of malaria control in Africa: a district perspective from Burkina Faso", *PLoS medicine*, vol. 4, no. 6, pp. e127.
- Kriesi, H., Adam, S. & Jochum, M. 2006, "Comparative analysis of policy networks in Western Europe", *Journal of European Public Policy*, vol. 13, no. 3, pp. 341.
- Landry, R., Amara, N. & Lamari, M. 2001, "Utilization of social science research knowledge in Canada", *Research Policy*, vol. 30, no. 2, pp. 333-349.
- Lavis, J.N. 2009, "How can we support the use of systematic reviews in policymaking?", *PLoS medicine*, vol. 6, no. 11, pp. e1000141.
- Lavis, J.N., Lomas, J., Hamid, M. & Sewankambo, N.K. 2006, "Assessing country-level efforts to link research to action", *Bulletin of the World Health Organization*, vol. 84, no. 8, pp. 620-628.
- Lavis, J.N., Posada, F.B., Haines, A. & Osei, E. 2004, "Use of research to inform public policymaking", *Lancet*, vol. 364, pp. 1615-21.
- Lavis, J.N., Ross, S.E., Hurley, J.E., Hohenadel, J.M., Stoddart, G.L., Woodward, C.A. & Abelson, J. 2002, "Examining the role of health services research in public policymaking", *The Milbank quarterly*, vol. 80, no. 1, pp. 125-154.
- Levin, D.Z. & Cross, R. 2004, "The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer", *Management science*, vol. 50, no. 11, pp. 1477-1490.
- Lewis, J.M. 2006, "Being around and knowing the players: Networks of influence in health policy", *Social science & medicine*, vol. 62, no. 9, pp. 2125-2136.

- Lomas, J. 2007, "The in-between world of knowledge brokering", *BMJ (Clinical research ed.)*, vol. 334, no. 7585, pp. 129-132.
- Lomas, J. 2000, "Using 'Linkage And Exchange' To Move Research Into Policy At A Canadian Foundation", *Health Affairs (Millwood)*, vol. 19, no. 3, pp. 236-240.
- Lubell, M., Scholz, J., Berardo, R. & Robins, G. 2012, "Testing Policy Theory with Statistical Models of Networks", *Policy Studies Journal*, vol. 40, no. 3, pp. 351-374.
- Marsh, D. 1998, *Comparing policy networks*, Open University Press, Buckingham, England.
- McPherson, M., Smith-Lovin, L. & Cook, J.M. 2001, "Birds of a feather: Homophily in social networks", *Annual review of sociology*, vol. 27, pp. 415-444.
- Mitton, C., Adair, C.E., McKenzie, E., Patten, S.B. & Wayne Perry, B. 2007, "Knowledge transfer and exchange: review and synthesis of the literature", *The Milbank quarterly*, vol. 85, no. 4, pp. 729-768.
- Oxman, A.D., Vandvik, P.O., Lavis, J.N., Fretheim, A. & Lewin, S. 2009, "SUPPORT Tools for evidence-informed health Policymaking (STP) 2: Improving how your organisation supports the use of research evidence to inform policymaking", *Health research policy and systems / BioMed Central*, vol. 7 Suppl 1, pp. S2-4505-7-S1-S2.
- Program in Policy Decision-making 2013, , *Evaluating knowledge-translation platforms in low- and middle-income countries* [Homepage of McMaster University], [Online]. Available: <http://www.researchtopolicy.ca/KTPEs/KTPE-overview> [2013, 11/05].
- Reagans, R. & McEvily, B. 2003, "Network Structures and Knowledge Transfer: The Effects of Cohesion and Range", *Administrative Science Quarterly*, vol. 48, no. 2, pp. 240-267.
- Robins, G., Lewis, J.M. & Wang, P. 2012, "Statistical Network Analysis for Analyzing Policy Networks", *Policy Studies Journal*, vol. 40, no. 3, pp. 375-401.
- Robins, G. 2007, "An introduction to exponential random graph (p*) models for social networks", *Social networks*, vol. 29, no. 2, pp. 173.

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Sandstrom, A. & Carlsson, L. 2008, "The Performance of Policy Networks: The Relation between Network Structure and Network Performance", *Policy Studies Journal*, vol. 36, no. 4, pp. 497-524.

Shearer, J.C. 2013a, *Chapter 2: The interaction of policy networks with institutions, interests and ideas in three health policy cases in Burkina Faso*, Ph.D. edn, McMaster University, Hamilton, ON.

Shearer, J.C. 2013b, *Chapter 3: Evidence-informed policy-making and policy innovation in Burkina Faso: does policy network structure matter?*, Ph.D. edn, McMaster University, Hamilton, ON.

Wasserman, S. & Pattison, P. 1996, "Logit models and logistic regressions for social networks: I. An introduction to Markov graphs and p^* ", *Psychometrika*, vol. 61, no. 3, pp. 401-425.

Weiss, C.H. 1979, "The many meanings of research utilization", *Public administration review*, vol. 39, no. 5, pp. 426.

WHO 2004a, *The Mexico statement on health research*, World Health Organization, Geneva.

WHO 2004b, *World report on knowledge for better health*, World Health Organization, Geneva.

Table 1: Network covariates and hypotheses

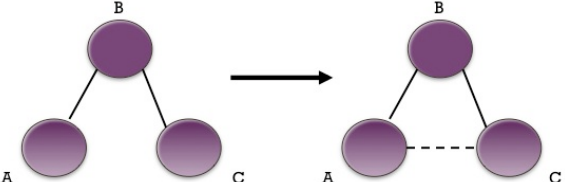

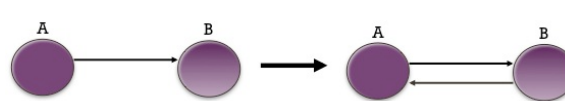


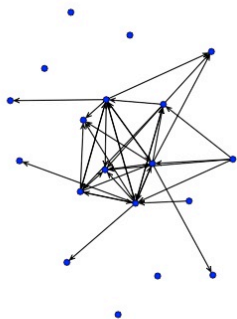
Covariate	Illustration	Mechanism	Hypothesized effect
Network closure: Conditional probability of tie A-C given existence of A-B and B-C.		Closure is associated with cohesive paradigms and information exchange and use that reinforces the status quo.	We expect to observe positive association of closure and tie formation in networks with a cohesive paradigm.
Reciprocity: Conditional probability of tie B-A given tie A-B.		Reciprocity is associated with ‘flat,’ decentralized governance.	We do not expect to observe a positive affect of reciprocity in evidence exchange networks in Burkina Faso.
Entrainment: Conditional probability of tie B-A for relationship y given existence of tie A-B for relationship x.		Entrainment is an empirical marker of instrumental evidence exchange.	We do not expect to observe a positive association of entrainment on tie formation.
Attribute effects: Conditional probability of tie A-B given attribute of A		Certain actor-level attributes are associated with evidence exchange.	We expect positive association of: research experience; higher employment rank; being a development partner.
Homophily: Conditional probability of tie A-B given shared attributes of A and B		Homophily reduces transaction costs of tie formation.	We expect positive association of homophily of: research experience; employment rank; organization type.

Figure 2a: Child health network – evidence provision network



Child health – evidence request network

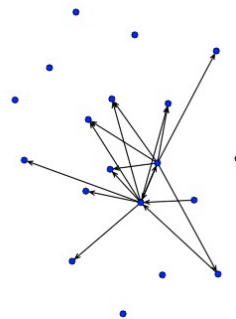
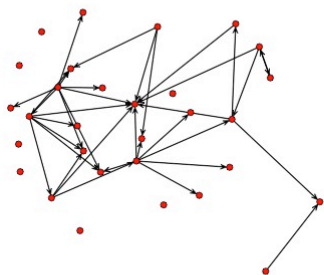


Figure 2b: Malaria network – evidence provision network



Malaria – evidence request network

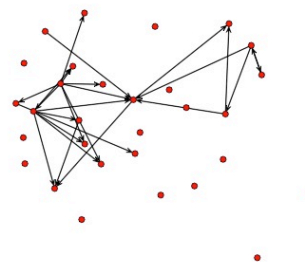
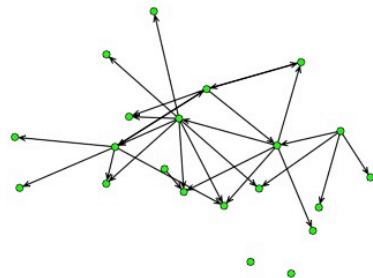


Figure 2c: HIV network – evidence provision network



HIV – evidence request network

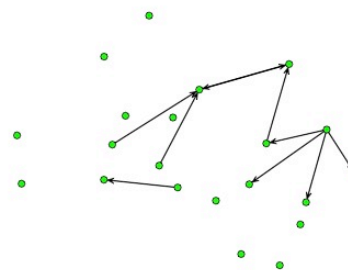


Table 2: Descriptive statistics

Variables	Child health	Malaria	HIV
<i>Actor variables</i>	<i>mean (sd) or n (%)</i>	<i>mean (sd) or n (%)</i>	<i>mean (sd) or n (%)</i>
Total actors nominated	39	49	39
Actors surveyed	21	30	19
Male	13 (68.4)	24 (80.0)	16 (76.2)
Graduate-level degree	17 (89.5)	27 (90.0)	18 (90.0)
Years in position	3.11 (2.85)	4.48 (4.06)	7 (4.87)
Experience as researcher	8 (44.4)	14 (46.7)	12 (57.1)
Government org	14 (73.7)	17 (56.7)	8 (38.1)
Civil society organization	0 (0)	9 (30.0)	9 (42.9)
Development partner organization	4 (21.1)	2 (6.67)	2 (9.52)
Other organization	1 (5.26)	2 (6.67)	2 (9.52)
Manager or higher employment level	9 (47.4)	8 (26.7)	13 (61.9)
<i>Research use outcomes</i>			
Research use (continuous)	3.50 (1.03)	2.69 (1.44)	2.89 (1.52)
Any research use (binary)	7 (43.8)	(34.6)	6 (31.6)
<i>Network variables</i>			
Edges: provision	37	36	28
Edges: request	17	25	10
Degree: provision (mean)	1.95	1.20	1.33
Degree: request (mean)	0.895	0.833	0.476
Density: provision	0.11	0.04	0.07
Density: request	0.05	0.03	0.02

Table 3. Parameter estimates (standard errors): provision networks

	Child health			Malaria			HIV		
	Structural effects model	Attribute effects model	Full model	Structural effects model	Attribute effects model	Full model	Structural effects model	Attribute effects model	Full model
<i>Structural effects</i>									
Edge intercept	-4.52 (0.96)*	-1.18 (0.70)*	-4.65 (1.83)*	-2.13 (0.32)*	-2.20 (0.44)*	-2.56 (0.52)*	-1.03 (0.37)*	-1.99 (1.03)*	-1.79 (1.14)
GWESP	2.81 (0.63)*	—	2.36 (0.78)*	0.74 (0.47)	—	0.78 (0.85)	0.382 (0.79)	—	0.405 (1.45)
Reciprocity	-5.10 (1.92)*	—	-3.52 (2.20)	-1.20 (1.15)	—	-1.71 (1.29)	0.007 (0.93)	—	0.318 (1.40)
Entrainment	5.15 (1.44)*	—	6.16 (1.73)*	3.23 (0.59)*	—	2.87 (0.63)*	2.29 (0.83)*	—	2.31 (0.98)*
<i>Attribute effects</i>									
Researcher	—	-0.23 (0.42)	-0.93 (0.98)	—	1.43 (0.37)*	1.021 (0.44)*	—	0.505 (0.56)	0.154 (0.60)
Civil society org.	—	No obs.	No obs.	—	-0.46 (0.32)	-0.671 (0.40)*	—	0.150 (0.46)	-0.120 (0.49)
Development partner org.	—	1.02 (0.45)*	0.31 (1.14)	—	-1.10 (0.67)	-0.813 (0.79)	—	3.37 (1.15)*	3.50 (1.16)*
Other	—	2.43 (1.19)*	5.04 (5.29)	—	0.81 (0.74)	0.217 (0.94)	—	2.10 (0.89)*	1.61 (1.04)
Manager/director	—	0.33 (0.35)	0.16 (0.80)	—	nf	nf	—	nf	nf
<i>Homophily</i>									
Researcher	—	nf	nf	—	nf	nf	—	nf	nf
Organization	—	nf	nf	—	nf	nf	—	nf	nf
AIC	233.7	179.5	176.4	345.3	369.1	342.8	210.1	191.6	193.1

* p<0.05; nf = did not improve model fit

Table 4. Parameter estimates (standard errors): request networks

	Child health			Malaria			HIV		
	Structural effects model	Attribute effects model	Full model	Structural effects model	Attribute effects model	Full model	Structural effects model	Attribute effects model	Full model
<i>Structural effects</i>									
Edge intercept	-4.00 (0.997)*	-1.47 (0.406)*	-4.67 (1.15)*	-3.66 (0.545)*	-2.64 (0.787)*	-4.19 (1.19)*	-3.37 (0.743)*	-5.83 (1.92)*	-6.74 (2.21)*
GWESP	1.49 (0.812)*	—	1.53 (0.848)*	1.26 (0.601)*	—	1.65 (2.88)	nf	—	nf
Reciprocity	-1.93 (1.49)*	—	-1.90 (1.62)	0.029 (1.28)	—	-1.43 (1.49)	1.98 (1.34)	—	-0.842 (2.14)
Entrainment	2.72 (1.12)*	—	2.96 (1.14)*	3.28 (0.604)*	—	3.18 (0.733)*	2.27 (0.832)*	—	2.31 (0.992)*
<i>Attribute effects</i>									
Researcher	—	0.088 (0.401)	0.652 (0.486)	—	1.90 (0.473)*	1.73 (0.688)*	—	1.70 (0.901)*	1.64 (1.01)
Civil society org.	—	nf	nf	—	-0.490 (0.498)	-0.313 (0.593)	—	1.30 (0.731)*	1.31 (0.788)
Development partner org.	—	nf	nf	—	-2.29 (0.979)*	-3.34 (1.41)*	—	nf	nf
Other	—	nf	nf	—	-0.407 (0.944)	-1.27 (1.21)	—	2.32 (0.953)*	1.85 (1.10)*
Manager/director	—	nf	nf	—	0.619 (0.379)	0.613 (0.478)	—	nf	nf
<i>Homophily</i>									
Researcher	—	nf	nf	—	nf	nf	—	nf	nf
Organization	—	nf	nf	—	-1.60 (0.663)*	-2.24 (0.933)*	—	nf	nf
AIC	183.4	208.7	183.5	310.6	334.7	306.9	162.7	171.6	DNC

* p<0.05; nf = term did not improve model fit;

Table 5. Univariate logistic regressions of actor degree on evidence use

Independent variable	Child health	Malaria	HIV
	Log odds (SE)	Log odds (SE)	Log odds (SE)
Indegree (provision)	-0.336 (1.16)	0.896 (0.941)	-1.01 (1.16)
Outdegree (provision)	3.87 (1.51)*	Predicted perfectly	3.31 (1.34)*
Indegree (request)	0.223 (1.10)	1.86 (0.949)*	0.118 (1.05)
Outdegree (request)	1.79 (1.31)	1.40 (0.881)	3.31 (1.34)*
N	16	26	19

* p<0.05

Chapter 5: Conclusion

The three research chapters in this thesis contribute to a greater understanding of the role of policy networks in health policy decision-making in a low-income country, with a focus on the effect of networks on evidence exchange and use, and innovation in these settings. This chapter begins with a reiteration of the findings and how they can be integrated to form a larger picture of networks, ideas, and policy change. Following this, the thesis is discussed in terms of its theoretical, substantive, and methodological contributions to the field. The strengths and limitations of this thesis are discussed, followed by a section on implications for policy and practice. This chapter ends with dissemination plans and suggestions for future research.

Principal findings

Each of the individual chapters in this thesis were based on data collected from policy actors across three policy cases in Burkina Faso. These qualitative and quantitative data provide in-depth narratives of policy formulation processes and outcomes, as well as measures of social networks including actors, their interactions, and their exchanges of evidence with other actors in the policy processes. Analysed using a variety of approaches, they highlight the significant role of networks in policy formulation, and specifically in the exchange and use of research evidence.

Chapter 2 sought to integrate network theories of policy change with variables more commonly used to explain policy change; namely, institutions, interests and ideas (“3Is”). Previous empirical and theoretical work was used to inform the development of a conceptual framework, with the understanding that certain domains (i.e., institutions) had been discussed much more in the network context than others (i.e., ideas). The resulting conceptual framework suggested that networks act as a system for organizing the remaining variables, thus mediating their effects in the policy process. Simplified, the conceptual framework states that institutional rules provide the scaffolding, or architecture, on which network structure evolves. Interests are embedded in actors and ideas are transmitted through network ties between actors. The conceptual framework was tested on empirical data from interviews with policy actors across the three case studies. Data confirmed that in all three cases, networks changed in composition and structure during the policy process, which ended in policy change. Whereas other policy network scholars have interpreted similar findings as evidence of the role of networks in policy change, the conceptual framework forced the consideration of the equally, if not more important role of the 3Is. Changes in networks were often caused by the introduction of new donor rules (institutions) that stated who should participate and how those interactions should be structured. These rules influenced the composition and representation of certain interests, thus shifting the balance of power. The introduction and spread of new ideas in the network was critical in informing policy change and was also closely linked to the role of donors. Overall, endogenous network change was rare

– occurring to an extent in the policy case that had the least donor involvement. Analyses of policy change that take networks as the major variable without acknowledgement of institutions, interests and ideas are missing critical pieces of the puzzle.

Chapter 3 shifted the level of analysis from the macro, conceptual level to the meso-level of empirically measurable networks and their outcomes. This chapter used quantitative network data to test hypotheses regarding the role of network structure on (1) evidence use, and (2) innovativeness at the policy case level. This chapter builds on previous research that has linked characteristics of network structure (i.e., network density, centralization, and heterogeneity) to outcomes such as efficiency and innovativeness (Howlett 2002, Sandstrom, Carlsson 2008), but shifts the focus to the outcomes of evidence use and innovativeness, both of which are relevant contemporary themes in low-income country policy-making. The lack of studies of evidence use in policy networks necessitated the borrowing of concepts and hypotheses from other fields, including organizational and management sciences. This analysis was also novel in that it was able to harness data on multiple types of networks for each policy case, including networks of evidence exchange to test hypotheses related to evidence use. Findings demonstrated that network heterogeneity – the measure of the diversity of a network’s actors – was associated with evidence use and innovativeness, confirming that exposure to new actors and new ideas was more likely to lead to the adoption and use of those ideas and innovations. I found that a network’s internal closure, as measured by its density and centralization,

determined how evidence was used and decisions made in policy networks. The highly closed child health network used evidence *symbolically*, to justify a pre-determined position, whereas the very open HIV network used it *instrumentally* to change policy, and the moderately open malaria network used it *conceptually*. Similar to Chapter 2, this study pointed to the significant role of donors in shaping network structure through embedding actors and ideas. Notably, the child health network's structure was essentially built upon ties of evidence exchange, demonstrating the strategic goal of evidence dissemination in this network, and its overall effect on network structure and outcomes. Data for different types of networks showed that evidence exchange networks were much sparser than interaction networks for the same actors. While this finding is not surprising, it suggests missed opportunities for knowledge transfer and evidence exchange in these contexts.

Chapter 4 narrowed the focus further to the level of network actors and their dyadic ties to each other. Using exponential random graph models (ERGM), this chapter modeled the conditions under which evidence was provided and/or requested between two actors, controlling for actor attributes and network effects. I found that network-level covariates explained more than half of the observed evidence exchange ties, and were thus more important than actor covariates. The most consistent effect was that of 'entrainment' – that the request or provision of evidence was more likely to occur between actors where the opposite relation – provision or request – already existed. The child health network demonstrated the empirical markers of closure, consistent with the whole-network observations of

Chapter 3, and this closure reinforced the creation of ties in the network. Regression models were built to test whether an actor's position in evidence exchange networks was associated with their use of evidence in decision-making. These models found a positive association between evidence use and network position. Findings of these models stress the essential role that networks play in knowledge transfer and exchange; any attempt to study or intervene in these processes should consider adopting a network approach. Taking findings from Chapters 3 and 4 together, I note that dense evidence exchange networks may increase the likelihood of evidence being 'used' in policy-making, but that this use is not always instrumental.

Study contributions

This thesis aimed to fill important theoretical, substantive, and methodological gaps in the measurement and analysis of policy networks, the understanding of health policy and systems research in low-income countries, and the analysis of evidence exchange and use in a network context.

Theoretical

Chapter 2 presented a novel conceptual framework illustrating how networks and the 3Is can be conceptually integrated to explain policy change. This was the first study to integrate theories across network, institutional, interest and idea variables. Practically, it defines how each of these variables may contribute to policy change and predicts how they may mediate each other.

Conceptually, the framework urges policy-makers and researchers to adopt a network lens, demonstrating the theoretical and empirical importance of networks in policy change while acknowledging the integrated role of the other variables. In marrying these concepts, Chapter 2 creates the possibility for a new research agenda for policy analysis.

Substantive

This thesis made a number of substantive contributions across multiple themes and research questions, beginning with the comprehensive description of three policy processes in Burkina Faso. A paucity of rigorous analyses of policy-making in low-income countries has slowed the improvement of processes that lead to effective health policies, and thus the improved health of populations (Gilson, Raphaely 2008). Chapter 2 provides the most detailed analysis of the policy cases: the introduction of the integrated community-based management of childhood illnesses; the reinstatement of a community-based treatment programme for malaria; and the removal of user fees for antiretroviral treatment for HIV. This analysis demonstrated that policy change was often predicated by changes in networks, institutions, interests and ideas. The role of donors stood out – particularly their role in reshaping institutional rules, which levelled the playing field in the child health and malaria cases. The cross-case analysis also pointed to the relative lack of endogenous network change; that is, policy networks rarely led to policy change without the influence of outside actors and ideas. This is an important finding in the context of networked governance, which posits that

policy networks can affect endogenous change in order to achieve policy goals (Klijn, Koppenjan 2000, Provan, Kenis 2008). Whereas networked governance has been shown to have important implications for policy processes in high-income countries, I suggest that its role may be lessened by the oversized influence of donors in low-income countries.

The role of donors was a theme throughout the chapters. Chapter 3 illustrated their activity in strategic information exchange in the child health case, which reinforced the symbolic use of evidence and minimal innovation at the policy case level. Chapter 4 delved deeper, illustrating that child health donors were more likely to forge evidence exchange ties and that those ties reinforced the closed and cohesive nature of that network. Donors were also important to the malaria case, mandating the participation of diverse sets of actors who facilitated the adoption of an innovative policy. In that case donors were also partly responsible for removing the incentives to use evidence instrumentally. Donors were least visible in the HIV case, which interestingly, demonstrated relationships between networks and outcomes that were most consistent with those observed in high-income settings.

A major substantive contribution has been the understanding of how policy networks were associated with policy processes and outcomes. At the network level, I demonstrated the association between certain network structures, and the use of evidence, and innovation. In identifying network structures facilitative of evidence use and innovation in this context, practitioners can begin to consider how to build networks to achieve strategic aims.

This thesis has made significant contributions to the understanding of whether, how and why research evidence is exchanged and used in health policy-making. Although systematic reviews had previously identified the role of interpersonal relationships in facilitating evidence exchange and use (Greenhalgh 2004, Lavis et al. 2005), the explicit role of social networks has received very little attention in the field of knowledge translation and evidence-informed policy-making. Chapter 4 is the first of its kind to explain the exchange of research evidence between actors, controlling for the network position of those actors and the overall network structure. In doing so, the ERGM models identified the relative significance of network factors, as compared to individual-level covariates, in explaining evidence exchange relationships. This finding, alone, should be enough to persuade knowledge translation (KT) researchers and practitioners to adopt a network lens, as networks are a key variable in evidence exchange.

These findings are expanded upon in Chapters 3 and 4 which explore how networks are associated with evidence *use*. First, an individual policy actor in Chapter 4 was far more likely to use evidence to inform his/her decisions if he/she was highly connected in evidence exchange networks. But Chapter 3 clarified that all evidence use was not equal and that different network structures were associated with different types of evidence use at the policy case level. For example, although the child health network had the greatest individual-level use of evidence, and the densest exchange networks, its ultimate use of evidence at the case level was symbolic. This raises important implications for the field of

KT; namely, that in the rush to achieve evidence-informed policy-making, actual ‘use’ of evidence may not be achieving the desired goals of formulating effective and equitable health policies (WHO 2004).

Finally, along with an improved understanding of how networks affected outcomes, this thesis highlighted the issue-specificity of some of those findings. Relationships between network structure and function, at the dyadic and whole network levels, were not always consistent across cases. This finding will be discussed further in relation to future research and implications for practice but suggests, in short, to ‘know your network.’

Methodological

This thesis married multiple methods and approaches to policy analysis and network analysis and applied those methods to novel research questions, demonstrating their feasibility and utility. First, the various angles taken to the analysis of policy networks validated the necessity of a mixed-methods approach in order to understand the complete picture of policy change and evidence use. A purely quantitative approach would have measured *how much* evidence was exchanged and used, but not *how* and *why* it was used as was possible with a qualitative approach. On the other hand, the quantitative modeling methods were instrumental in definitively identifying the role of networks in evidence exchange and broke ground as far as this outcome was concerned.

This research project demonstrated the feasibility and usefulness of applying network approaches to the study of health policy networks in a low-

income country. Initial concerns of the scope of data collection were assuaged by policy actors' willingness to participate. Participants' understanding and appreciation of a network lens facilitated the collection of sometimes sensitive data on professional relationships. Further, the study questionnaire was able to successfully capture three types of ties for each network, and the analysis methods could be applied to each type of tie, adding depth and perspective to actors' networks in policy-making and their outcomes.

Last, this research project reiterated the importance of the rigorous, empirical measurement of policy networks. Network data collection is relatively resource and time intensive, necessitating a census of the entire population of actors. While the search persists for 'rapid' measurement techniques or approximation methods, this thesis demonstrates that networks are like fingerprints, and each network fingerprint behaves and responds differently. This is bad news for those who wish to create interventions for policy networks without measuring them. As of now, our understanding of policy networks is not sufficient to support one-size-fits-all network interventions.

Strengths and limitations

There are a number of strengths of this thesis worth mentioning. First, the application of a network lens was both novel and enlightening for these research questions. This thesis's findings support the ongoing use of network theories and tools in research and practice. Next, the focus on evidence exchange and use fills an important gap in the literature, and responds to contemporary debates and ideas

about evidence-informed policy-making. This thesis identified the role of networks in these processes and has provided food for thought for how to harness networks to their study and intervention.

A third strength of this thesis is its use of mixed methods. The deep understanding of these policy processes, and particularly the role of networks, would not have been possible without an equally broad sample of methods and approaches, including qualitative interviews, case study approaches, sociometric survey methods and analyses, and statistical network analyses. The application of ERGMs to evidence exchange in policy networks is, to my knowledge, a first. ERGM approaches, which enable the modeling of complex interdependencies in networks including tie formation and dissolution, are on the cutting edge of statistical and network sciences. Despite the sophistication of these methods, their findings are easy to understand and immediately applicable to practice.

A fourth strength of this thesis is its multi-disciplinary integration of concepts and approaches, touching on theories from political science, policy sciences, political sociology, organizational sciences, knowledge translation, health systems research, and social network analysis. The nascent state of many of the research themes (i.e., policy networks, low-income country policy-making, evidence-informed policy-making), and particularly of their combinations, required the ongoing synthesis of theories, concepts and approaches from across these diverse fields and disciplines. The successful integration of multiple theories and disciplines adds greater depth and validity to these findings. While the substantive findings of this thesis will be relevant to those who support policy and

health systems in low-income countries, the study concepts and approaches will be of academic interest to scholars in political science, public policy, health policy, and social network analysis. In short, this thesis has the potential to connect otherwise unconnected communities of thinkers and doers, and to expose each to new ways of thinking and doing.

The fifth strength is this thesis's strong internal validity due to the choice of diverse cases (Gerring 2004). The external validity of these findings are also relevant to other policy issues and settings, due to the fact that the health domain in Burkina Faso is relatively similar with other policy domains in and outside of Burkina Faso.

This thesis also has limitations worth discussing. First, the limited conceptual basis and/or empirical literature on some of the study themes meant that many of the research questions and hypotheses were guided by a synthesis of relevant threads. This was true for hypotheses relating evidence use to network structure, for which there was no specific body of literature. However, many of these gaps in knowledge were overcome by a deep understanding of the concepts and their relation to each other. In this way I was able to draw on otherwise unconnected concepts and literature to inform this thesis's hypotheses.

The concept of 'evidence use,' while widely advocated by certain actors, was simultaneously difficult to conceptualize for study respondents and to operationalize as measurable constructs. A survey question on actors' use of evidence was not well understood in pilot interviews, and as such I asked a series of interview questions to indirectly elicit the respondents' awareness, exchange

and use of evidence, and then coded their responses according to a validated scale (Landry 2003). These responses form the dependent variables of actor-level use in Chapter 4. Similarly difficult was the coding of evidence use at the policy case level for Chapter 3. This process highlighted the fact that evidence is used in multiple ways during a policy process (Contandriopoulos et al. 2010). The coding of innovativeness in this study was similarly difficult, partly because of the subjective nature of innovation, but also because options to innovate were often constrained. Should a policy case be ‘penalized’ if it chooses an option that is not innovative, but is effective and equitable?

All three research chapters, but particularly Chapters 3 and 4 were limited by the fact that data collected on policy networks were incomplete. Not all actors could be accessed for interviews, and as such data are missing on a number of actors and their ties. This limitation is common of network analyses (and of any survey-based research). An analysis of missing actors revealed that they did not differ on their attributes from actors in the study, except in the child health case where a large proportion of missing actors were from international organizations based outside of the country. It is thus for pragmatic reasons that they could not be accessed for interviews, but it misses an important component of the overall narrative for that case.

The findings related to the role of donors in policy change were limited by the fact that the interview guide was not designed to elicit the role played by actors in network change, nor whether actors used networks strategically to attain certain outcomes.

Finally, while this thesis acknowledges the role of network change, quantitative, longitudinal data documenting these changes were not collected. This should be an aim of future research.

Implications for policy and practice

This thesis has a number of conceptual and practical implications for policy and practice. Conceptually, this thesis highlights the role of networks in policy-making, a concept that has yet to be considered fully in low-income countries. I hope this finding will begin to shift the paradigm of how policy-making is conceived in these settings, leading to more appropriately tailored interventions to improve policy processes and outcomes.

This thesis makes a number of practical contributions. For the field of KT, it identifies mutable variables that support evidence exchange and use. First, evidence use is linearly correlated with its exchange and thus KT interventions that support exchange should be encouraged. These interventions should attempt to measure network structure in order to understand the actors most strategically positioned to exchange evidence, and to change that structure by introducing new actors and new ideas. Interventions should begin to address the top-down dissemination of evidence by building capacity and confidence among actors to request evidence. Across all chapters the *request* of evidence was a notable weakness of actors and their systems. Efforts must be made to create a policy-making culture where there is demand for evidence, and where actors are willing to use political capital to request and provide it.

For those who practice analysis *for* policy-making, including the practice of networked governance, this thesis (1) observed minimal network governance led from within; (2) observed that when it did occur, as in the case of civil society actors in the HIV case, it was successful at eventually facilitating policy change. The tension between networked governance by external actors, versus by internal actors, should be addressed and overcome by building capacity in both communities to lead change and work strategically through their professional interactions.

Strategy for dissemination

A thesis about knowledge translation deserves a KT strategy. Too often, researchers working in low-income countries leave the country with their data and fail to disseminate their findings back to country-level actors who can use them most. I plan to return to Burkina Faso to organize a dissemination workshop for each policy case, where respondents and other stakeholders will be invited. I will email a brief synopsis of the thesis and its findings in French to all respondents. All study respondents will receive email alerts to eventual journal articles of these studies.

At the global level, I have already presented these results in a number of conferences and academic fora. Building on this, I plan to submit each chapter for peer-reviewed publication in academic journals. My target journals will reach a wide range of audiences. Chapter 2 will be targeted to low- and middle-income country health policy and systems researchers. Chapter 3 will target policy

sciences scholars in order to raise awareness of the application of these approaches to new topics and contexts. Chapter 4 will target a large, general readership in order to raise awareness of SNA approaches and to disseminate the substantive findings related to predictors of evidence exchange and use.

Future research

While this thesis filled numerous gaps, it raised equally plentiful questions for future exploration. First, each of the approaches in this thesis should be tested in additional policy domains and country settings to improve generalizability. It is worth considering which additional outcomes should be measured and analysed through the network analysis approaches discussed. Other outcomes, including but not limited to the exchange of financial resources, the exchange and use of other information or advice, the efficiency of the process, public participation, etc., should be considered. As these approaches are tested in the future, more effort must be made to collect and analyse longitudinal data on policy networks. Longitudinal data will begin to explicitly describe and explain network dynamics and the effect of those changes on outcomes of interest.

This thesis highlighted the uniqueness of each policy network and cautioned against attempting to apply broad network principals to policy networks without first understanding their specifics. This finding supports ongoing efforts to validate new data collection approaches that will improve timeliness and reduce respondent burden. These may include using egocentric data to model whole

networks (Simpson, Moussa & Laurienti 2012) or secondary sources of data, such as lists of participants from meetings.

Findings related to donors and their role in structuring networks are incomplete and warrant further research. Were donors aware that their actions – introducing new rules, mandating actors, introducing ideas – altered network structure in ways that facilitated policy change? These questions deserve further study, as do similar questions relating to other actors, including civil society and government civil servants.

Finally, respondents themselves noted two gaps needing further attention. First, the population-level impact of these policies is unknown, and thus this thesis studies the processes and its process-related outcomes, but not the true public health outcomes of said processes. Policy actors in this study viewed this as a weakness and an area for future research. Second, respondents suggested that the study of policy-making was not as necessary as the study of policy implementation. This point is taken, and future research should aim to explore the complete cycle of policy-making. While a substantial endeavour, such research would contribute substantially to the field of health systems and policy.

References

- Contandriopoulos, D., Lemire, M., Denis, J.L. & Tremblay, E. 2010, "Knowledge exchange processes in organizations and policy arenas: a narrative systematic review of the literature", *The Milbank quarterly*, vol. 88, no. 4, pp. 444-483.
- Gerring, J. 2004, "What is a case study and what is it good for?", *American Political Science Review*, vol. 98, no. 2, pp. 341.
- Gilson, L. & Raphaely, N. 2008, "The terrain of health policy analysis in low and middle income countries: a review of published literature 1994-2007", *Health policy and planning*, vol. 23, no. 5, pp. 294-307.
- Greenhalgh, T. 2004, "Diffusion of innovations in service organizations: systematic review and recommendations", *The Milbank quarterly*, vol. 82, no. 4, pp. 581.
- Howlett, M. 2002, "Do Networks Matter? Linking Policy Network Structure to Policy Outcomes: Evidence from Four Canadian Policy Sectors 1990-2000", *Canadian Journal of Political Science/Revue canadienne de science politique*, vol. 35, no. 02, pp. 235.
- Klijn, E. & Koppenjan, J.F.M. 2000, "Public Management and Policy Networks: Foundations of a network approach to governance", *Public Management*, vol. 2, no. 2, pp. 135-158.
- Landry, R. 2003, "The extent and determinants of the utilization of university research in government agencies", *Public administration review*, vol. 63, no. 2, pp. 192.
- Lavis, J.N., Davies, H., Oxman, A., Denis, J.L., Golden-Biddle, K. & Ferlie, E. 2005, "Towards systematic reviews that inform healthcare management and policymaking", *J Health Serv Res Policy*, vol. 10, pp. 35-48.
- Provan, K.G. & Kenis, P. 2008, "Modes of Network Governance: Structure, Management, and Effectiveness", *Journal of Public Administration Research and Theory*, vol. 18, no. 2, pp. 229-252.
- Sandstrom, A. & Carlsson, L. 2008, "The Performance of Policy Networks: The Relation between Network Structure and Network Performance", *Policy Studies Journal*, vol. 36, no. 4, pp. 497-524.
- Simpson, S.L., Moussa, M.N. & Laurienti, P.J. 2012, *An exponential random graph modeling approach to creating group-based representative whole-brain connectivity networks*, Elsevier.

PhD Thesis – Jessica Shearer; McMaster University – Health Policy

WHO 2004, *World report on knowledge for better health*, World Health Organization, Geneva.

Annex 1: Interview Guides

Le guide d'entretien, la pneumonie

I. L'histoire

Pour commencer, est-ce que vous pourriez, en bref, décrire l'histoire, ou retracer la genèse du développement du programme/projet de la prise en charge au domicile de la pneumonie, dès que sa conceptualisation jusqu'à maintenant.

Comment est-ce que vous vous êtes impliqué dans ce processus?

À quelle étape est-ce que vous vous êtes la plus impliqués ?

II. Le processus de définition du problème

a. Processus

Quel problème est-ce que la PEC des IRA à base communautaire ont répondu ?

- La pneumonie chez des enfants
- Le faible accès aux soins

Quand est-ce que les acteurs politiques ou technique sont-ils devenus conscient de ce problème?

Comment est-ce que les acteurs ont-ils devenu conscient de ce problème?

- Le plaidoyer
- Les données administratives
- Les données scientifiques
- Les partenaires

Est-ce qu'il y avait des acteurs qui ont poussé la connaissance de ce problème ? Qui ont fait le plaidoyer autour de ce problème ?

Entre le palu et la pneumonie, lequel cause plus de mortalité chez les enfants ?

Historiquement, pourquoi la pneumonie n'inquiétait pas le gouvernement tant que le palu ?

b. Les acteurs

Quelle structure au Ministère de la santé est normalement la responsable pour ce problème.

Qu'est-ce que c'était leur réaction de ce problème jusqu'à ces temps-la ?

Est-ce qu'il y avait le plaidoyer pour la prise en charge des cas au domicile ? Qui était la plus forte voix ? La plus influente ?

Qui étaient les autres acteurs à ce temps ?

- Pourquoi la question était-elle préoccupante?

Est-ce qu'ils partageaient le même point de vue sur le problème ? Les mêmes intérêts ?

Quels acteurs ou services travaillaient ensemble ?

- Utiliser des stickers pour faire le réseau

Comment pourriez-vous décrire les relations professionnelles chez les acteurs?

Quels sont les facteurs qui ont permis les acteurs à travailler ensemble ?

Quels sont les obstacles qui ont empêché certains acteurs de travailler ensemble ?

Est-ce qu'il y avait une masse critique des acteurs qui voulaient lutter contre ce problème ?

III. Le processus de déterminer le politique

Quelles options programmatiques ou politiques étaient considérées par des acteurs pour la prise en charge du problème ?

Comment est-ce que la PEC des IRA est-il devenu considéré comme option programmatique / politique?

- Contenus : populations cibles, le cout, des études d'efficacité, les antibiotiques
- Contexte : capacité des fonctionnaires impliquées, système de santé décentralisé, disponibilité des fonds, fiabilité, l'engagement des partenaires, la contractualisation, incertitude des agents de santé communautaire
- Processus : qui/quels service(s) prennent de décision ? Est-ce qu'un changement politique a besoin de l'intervention du Cabinet ? Du législation ?

- Les autres expériences programmatiques, les expériences du PECADO-M : est-ce que le PECADO du palu déjà existait a ce moment-la ?
- Les expériences programmatiques d'ailleurs
- Les études du Burkina
- Les études d'ailleurs
- Les experts, recommandations
- La disponibilité des fonds ?

Qui a participé dans la formulation du programme?

Par rapport au processus pour déterminer le problème, est-ce que les acteurs impliqués pendant la formulation ont changé?

Selon vous, qui était la personne la plus influente pendant la formulation du projet ?

Vous pensez que le programme serait mis à l'échelle nationale par le gouvernement ?

- Quelles sont les barrières?
- Quelles sont les opportunités ?

Quels acteurs doit donner leur soutien pour la mis à l'échelle de ce programme ?

Quels résultats du projet seront nécessaires ?

Est-ce le PECADO a ouvert une porte pour le PEC-IRA ?

Au Burkina Faso, est-ce que le PEC est une stratégie novatrice / innovative ?

c. Les bases factuelles

Nous avons discuté comment le problème est devenu problème signifiant chez des acteurs. Est-ce que vous pouvez agrandir comment des idées ou des informations ont joué un rôle dans ce processus ?

- Valeurs
- Données administratives
- Données scientifiques

Quand je dit « bases factuelles », qu'est-ce que ça va dire pour vous ? Pour la plupart des acteurs impliquées ?

En général, quels types de bases factuelles sont les plus utilisées par les décideurs ? Les plus informatives?

- Est-ce qu'il y avait des bases factuelles pertinentes de ce problème ? (la conscience)
- Qu'est-ce que ces bases factuelles ont dit ? (la compréhension)
- Qu'est-ce que vous avez pensé de ces données ? Est-ce que ces données ont changé votre conception de ce problème ?
- Comment est-ce que vous êtes devenu conscient de ces bases factuelles ?
- Chez des autres acteurs, est-ce que ils ont connu ces bases factuelles ? Est-ce que vous vous en avez partagé ? (la discussion)
- Est-ce que vous en avez cité dans les rapports ou les présentations qui vous avez préparé ? (la référence) Comment est-ce que vous avez utilisé ces données désormais ?

Typiquement, est-ce que les bases factuelles font des contributions importantes dans l'identification des problèmes importantes? La discussion des options ? La formulation des programmes/politiques ?

Selon vous, quelles sont des difficultés pour utiliser des bases factuelles ? Des facilités ?

Les reseaux

(Regardant au réseau en papier)

Je voudrais discuter le réseau politique pour le PECADO. Il représente plusieurs d'acteurs et d'institutions. Est-ce que c'est typique pour la formulation d'un programme ? Qu'est-ce que vous pensez de ce nombre ? Il y en a trop ? Il y en a peu ?

Comment est-ce que ces acteurs travaillent ensemble ?

- Des règles, des comportements ?

Est-ce que ces acteurs partagent le même point de vue ? Les mêmes intérêts ?

Si des informations ou des ressources existaient dedans ce réseau, est-ce que vous pourriez en accéder? Comment?

Vous connaissez nombreux groupes et institutions diverse. Comment vous êtes devenu avoir des relations? Est-ce qu'il y a des bénéfices à connaître nombreux gens? Les difficultés?

Est-ce que des autres acteurs, ils vous demandent des informations, des ressources ?

Demandez-vous à eux des informations, des ressources ?

Normalement, comment est-ce que vous interagissez avec des autres acteurs. Face à face? Par téléphone? Par email?

d. Le projet SURE

Vous avez mentionné le projet SURE/EVIPNet

Pendant le processus, comment est-ce que vous pourriez décrire le rôle du projet SURE?

Quels types d'activités est-ce qu'ils ont fait?

Si le projet n'existait pas, quels résultats du processus de formuler le programme du PECADO est-ce que vous auriez prévu?

Auriez-vous d'autres informations ?

Merci beaucoup pour votre participation aujourd'hui.

Le guide d'entretien, malaria

I. L'histoire

Pour commencer, est-ce que vous pourriez, en bref, décrire l'histoire, ou retracer la genèse du développement du programme/politique PECADO, dès que sa conceptualisation jusqu'à maintenant.

Pourquoi est-ce que vous vous êtes impliqué dans ce processus?

À quelle étape est-ce que vous vous êtes le plus impliqués ?

II. Le processus de définition du problème

a. Processus

Qu'est-ce que c'était le problème à qui le PECADO ont répondu ?

- Le palu chez des enfants
- Le faible accès aux soins
- Le faible accès aux ACT

Quand est-ce que les acteurs politique ou technique ont-ils été conscient de ce problème?

Comment est-ce que les acteurs ont-il devenu conscient de ce problème?

- Le plaidoyer
- Les données administratives
- Les données scientifiques
- Les partenaires

Est-ce qu'il y avait des acteurs qui ont poussé la connaissance de ce problème ? Qui ont fait le plaidoyer autour du problème ?

b. Les acteurs

Quelle structure au Ministère de la santé est normalement la responsable pour ce problème.

Qu'est-ce que c'était leur réaction de ce problème jusqu'à ces temps-la ?

Est-ce qu'il y avait le plaidoyer pour la prise en charge des cas au domicile ? Qui était la plus forte voix ? La plus influente ?

Qui étaient les autres acteurs à ce temps ?

- Pourquoi la question était-elle préoccupante?

Est-ce qu'ils partageaient le même point de vue sur le problème ? Les mêmes intérêts ?

Quels acteurs ou services travaillaient ensemble ?

- Utiliser des stickies pour faire le réseau

Comment pourriez-vous décrire les relations professionnelles chez les acteurs?

Quels sont les facteurs qui ont permis les acteurs à travailler ensemble ?

Quels sont les obstacles qui ont empêché certains acteurs de travailler ensemble ?

Est-ce qu'il y avait une masse critique des acteurs qui voulaient lutter contre ce problème ?

III. Le processus de déterminer le politique

Quelles options programmatiques ou politiques étaient considérées par des acteurs pour la prise en charge du problème ?

Comment est-ce que le PECADO est-il devenu considéré comme option programmatique / politique?

- Contenus : populations cibles, les ACTs, le cout, des études d'efficacité
- Contexte : capacité des fonctionnaires impliquées, système de santé décentralisé, disponibilité des fonds, fiabilité, l'engagement des partenaires, la contractualisation,
- Processus : qui/quels service(s) prennent de décision ?

- Les autres expériences programmatiques
- Les expériences programmatiques d'ailleurs
- Les études du Burkina
- Les études d'ailleurs
- Les experts, recommandations

Qui a participé dans la formulation du PECADO ?

Par rapport au processus pour déterminer le problème, est-ce que les acteurs ont changé?

Comment est-ce que la décision a été prise ? Par qui ?

Selon vous, qui était la personne la plus influente pendant la prise de décision?

Au Burkina Faso, est-ce que le PECADO est une stratégie novatrice / innovative ?

Selon vous, est-ce que le gouvernement va mis à l'échelle des autres stratégies pour la prise en charge des cas au domicile, dont la pneumonie, la diarrhée, la malnutrition ?

c. Les bases factuelles

Nous avons discuté comment le problème est devenu problème signifiant chez des acteurs. Est-ce que vous pouvez agrandir comment des idées ou des informations ont joué un rôle dans ce processus ?

- Valeurs
- Données administratives
- Données scientifiques

Quand je dit « bases factuelles », qu'est-ce que ça va dire pour vous ? Pour la plupart des acteurs impliqués ?

En général, quels types de bases factuelles sont les plus utilisées par les décideurs ? Les plus informatives?

- Est-ce qu'il y avait des bases factuelles pertinentes de ce problème ? (la conscience)
- Qu'est-ce que ces bases factuelles ont dit ? (la compréhension)
- Qu'est-ce que vous avez pensé de ces données ? Est-ce que ces données ont changé votre conception de ce problème ?
- Comment est-ce que vous êtes devenu conscient de ces bases factuelles ?
- Chez des autres acteurs, est-ce que ils ont connu ces bases factuelles ? Est-ce que vous vous en avez partagé ? (la discussion)
- Est-ce que vous en avez cité dans les rapports ou les présentations qui vous avez préparé ? (la référence) Comment est-ce que vous avez utilisé ces données désormais ?
- À quel niveau est-ce que ces bases factuelles, ont-ils informé vos décisions/recommandations pendant cette processus décisionnel ?

Typiquement, est-ce que les bases factuelles font des contributions importantes dans l'identification des problèmes importantes? La discussion des options ? La formulation des programmes/politiques ?

Selon vous, quelles sont des difficultés pour utiliser des bases factuelles ? Des facilités ?

Les reseaux

(Regardant au réseau en papier)

Je voudrais discuter le réseau politique pour le PECADO. Il représente plusieurs d'acteurs et d'institutions. Est-ce que c'est typique pour la formulation d'un programme ?

Qu'est-ce que vous pensez de ce nombre ? Il y en a trop ? Il y en a peu ?

Comment est-ce que ces acteurs travaillent ensemble ?

- Des règles, des comportements ?

Est-ce que ces acteurs partagent le même point de vue ? Les mêmes intérêts ?

Si des informations ou des ressources existaient dedans ce réseau, est-ce que vous pourriez en accéder? Comment?

Vous connaissez nombreux groupes et institutions diverse. Comment vous êtes devenu avoir des relations? Est-ce qu'il y a des bénéfices à connaître nombreux gens? Les difficultés?

Est-ce que des autres acteurs, ils vous demandent des informations, des ressources ?

Demandez-vous à eux des informations, des ressources ?

Normalement, comment est-ce que vous interagissez avec des autres acteurs. Face à face? Par téléphone? Par email?

d. Le projet SURE

Vous avez mentionné le projet SURE/EVIPNet

Pendant le processus, comment est-ce que vous pourriez décrire le rôle du projet SURE?

Quels types d'activités est-ce qu'ils ont fait?

Si le projet n'existait pas, quels résultats du processus de formuler le programme du PECADO est-ce que vous auriez prévu?

Auriez-vous d'autres informations ?

Merci beaucoup pour votre participation aujourd'hui.

Le guide d'entretien, la gratuite des ARV

I. L'histoire

Pour commencer, est-ce que vous pourriez, en bref, décrire l'histoire, ou retracer la genèse du développement du programme/projet de la prise en charge au domicile de la pneumonie, dès que sa conceptualisation jusqu'à maintenant.

Comment est-ce que vous vous êtes impliqué dans ce processus?

À quelle étape est-ce que vous vous êtes le plus impliqués ?

II. Le processus de définition du problème

a. Processus

Quel problème est-ce que la gratuite des ARV ont répondu ?

- L'accès financière
- Le faible taux de traitement

Quand est-ce que les acteurs politiques ou technique sont-ils devenus conscient de ce problème?

Comment est-ce que les acteurs ont-ils devenu conscient de ce problème?

- Le plaidoyer
- Les données administratives
- Les données scientifiques
- Les partenaires

Est-ce qu'il y avait des acteurs qui ont poussé la connaissance de ce problème ? Qui ont fait le plaidoyer autour de ce problème ?

Pour les PVVIH, est-ce cette problématique la plus préoccupante ?

b. Les acteurs

Quelle structure au Ministère de la santé est normalement la responsable pour ce problème.

Qu'est-ce que c'était leur réaction de ce problème jusqu'à ces temps-la ?

Est-ce qu'il y avait le plaidoyer pour la gratuite? Qui était la plus forte voix ? La plus influente ?

Qui étaient les autres acteurs à ce temps ?

- Pourquoi la question était-elle préoccupante?

Est-ce qu'ils partageaient le même point de vue sur le problème ? Les mêmes intérêts ?

Quels acteurs ou services travaillaient ensemble ?

- Utiliser des stickies pour faire le réseau

Comment pourriez-vous décrire les relations professionnelles chez les acteurs?

Quels sont les facteurs qui ont permis les acteurs à travailler ensemble ?

Quels sont les obstacles qui ont empêché certains acteurs de travailler ensemble ?

Est-ce qu'il y avait une masse critique des acteurs qui voulaient lutter contre ce problème ?

III. Le processus de déterminer le politique

Quelles options programmatiques ou politiques étaient considérées par des acteurs pour la prise en charge du problème ?

- Les subventions
- La gratuite

Comment est-ce que la gratuite est-il devenu considéré comme option programmatique / politique?

- Contenus : gratuite vs subvention ; population cible ;
- Contexte : coût des ARV au niveau mondial ; disponibilité des fonds, l'engagement des partenaires ; plaidoyer
- Processus : qui/quels service(s) prennent de décision ? Est-ce qu'un changement politique a besoin de l'intervention du Cabinet ? Du législation ?

- Les autres expériences programmatiques, les expériences du subventions des autres maladies ?
- Les expériences programmatiques des autres pays
- Les études du Burkina
- Les études des autres pays
- Les experts, recommandations
- La disponibilité des fonds ?

Qui a participé dans la formulation du programme?

Par rapport au processus pour déterminer le problème, est-ce que les acteurs impliqués pendant la formulation ont changé?

Selon vous, qui était la personne la plus influente pendant la formulation du projet ?

Vous pensez que le programme serait mis à l'échelle nationale par le gouvernement ?

- Quelles sont les barrières?
- Quelles sont les opportunités ?

Quels acteurs doit donner leur soutien pour la mis à l'échelle de ce programme ?

Quels résultats du projet seront nécessaires ?

Au Burkina Faso, est-ce que la gratuité est une stratégie novatrice / innovative ?

c. Les bases factuelles

Nous avons discuté comment le problème est devenu problème signifiant chez des acteurs. Est-ce que vous pouvez agrandir comment des idées ou des informations ont joué un rôle dans ce processus ?

- Valeurs
- Données administratives
- Données scientifiques

Quand je dit « bases factuelles », qu'est-ce que ça va dire pour vous ? Pour la plupart des acteurs impliqués ?

En général, quels types de bases factuelles sont les plus utilisées par les décideurs ? Les plus informatives?

- Est-ce qu'il y avait des bases factuelles pertinentes de ce problème ? (la conscience)
- Qu'est-ce que ces bases factuelles ont dit ? (la compréhension)
- Qu'est-ce que vous avez pensé de ces données ? Est-ce que ces données ont changé votre conception de ce problème ?
- Comment est-ce que vous êtes devenu conscient de ces bases factuelles ?

- Chez des autres acteurs, est-ce que ils ont connu ces bases factuelles ? Est-ce que vous vous en avez partagé ? (la discussion)
- Est-ce que vous en avez cité dans les rapports ou les présentations qui vous avez préparé ? (la référence) Comment est-ce que vous avez utilisé ces données désormais ?
- À quel niveau est-ce que ces bases factuelles, ont-ils informé vos décisions/recommandations pendant cette processus décisionnel ?

Typiquement, est-ce que les bases factuelles font des contributions importantes dans l'identification des problèmes importantes? La discussion des options ? La formulation des programmes/politiques ?

Selon vous, quelles sont des difficultés pour utiliser des bases factuelles ? Des facilités ?

Les reseaux

(Regardant au réseau en papier)

Je voudrais discuter le réseau politique pour le PECADO. Il représente plusieurs d'acteurs et d'institutions. Est-ce que c'est typique pour la formulation d'un programme ? Qu'est-ce que vous pensez de ce nombre ? Il y en a trop ? Il y en a peu ? Comment est-ce que ces acteurs travaillent ensemble ?

- Des règles, des comportements ?

Est-ce que ces acteurs partagent le même point de vue ? Les mêmes intérêts ?

Si des informations ou des ressources existeraient dedans ce réseau, est-ce que vous pourriez en accéder? Comment?

Vous connaissez nombreux groupes et institutions diverse. Comment vous êtes devenu avoir des relations? Est-ce qu'il y a des bénéfices à connaître nombreux gens? Les difficultés?

Est-ce que des autres acteurs, ils vous demandent des informations, des ressources ?

Demandez-vous à eux des informations, des ressources ?

Normalement, comment est-ce que vous interagissez avec des autres acteurs. Face à face? Par téléphone? Par email?

d. Le projet SURE

Vous avez mentionné le projet SURE/EVIPNet

Pendant le processus, comment est-ce que vous pourriez décrire le rôle du projet SURE?

Quels types d'activités est-ce qu'ils ont fait?

Si le projet n'existait pas, quels résultats du processus de formuler le programme du PECADO est-ce que vous auriez prévu?

Auriez-vous d'autres informations ?

Merci beaucoup pour votre participation aujourd'hui.

Annex 2: Social Network and Demographic Questionnaire

Section 1 : Les qualités personnelles et données démographiques

Study ID		
Cas		
Votre sexe :	masculin	0
	féminin	1
Quel est votre diplôme le plus élevé	Licence	1
	master ou études médicales	2
	doctorat	3
Dans quelle discipline	médecine	1
	santé publique	2
	économie	3
	sciences sociales	4
	administration publique	5
	autre	6
Avez-vous de l'expérience comme chercheur	Non	0
	Oui	1
Pendant l'élaboration, dans quelle organisation travailliez-vous ?		_____
Pendant l'élaboration, dans quel type d'organisation travailliez-vous ?	La Fonction Publique du Burkina Faso	1
	société civile/ONG	2
	organisation internationale/bilatéral	3
	fondation	4
	organisation de recherche Burkinabé	5
	organisation de recherche d'ailleurs	6
	autre	7

Section 3: Les gens avec qui vous interagissiez pendant le processus décisionnel

Définition : « interagir » ça va dire les gens avec qui vous travailliez ou parliez pendant le processus décisionnel au sujet de la politique/le programme discuté ici.

- a) Nommez, dans le tableau dessous, des personnes avec qui vous interagissiez pendant le processus décisionnel. Vous pouvez nommer n’importe combien de personnes. Veuillez indiquer leur organisation aussi.

Pour chaque nom :

- i. À quelle **fréquence** est-ce que vous vous êtes parlé pendant le processus: quotidiennement, hebdomadairement, mensuellement, moins souvent
- ii. Est-ce que vous lui avez **demandé** des résultats issus de la recherche? **Non**
Oui
- iii. Est-ce que vous lui avez **donné** des résultats issus de la recherche? **Non** **Oui**

Nom	Fréquence (4=quotidien ; 3=hebdomadaire ; 2=mensuel ; 1=moins)	Demandé (oui/non)	Donné (oui/non)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

Annex 3: Types of respondents interviewed

Type of organization	Policy case							Total
	Child health	Malaria	HIV	Child health & malaria	Malaria and HIV	Child health, malaria & HIV		
Government	10	12	10	5	1	1	39	
NGO/CSO	0	9	14	0	1	0	24	
IO	9	3	5	2	0	0	19	
Other	1	6	3	0	1	0	11	
Total	20	30	32	7	3	1	93	

Annex 5: Ethical approvals



RESEARCH ETHICS BOARD



REB Office, 293 Wellington St. N., Suite 102, Hamilton, ON L8L 8E7
Telephone: 905-521-2100, Ext. 42013
Fax: 905-577-8378

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Obstetrics/Gynecology

March 29, 2011

APR 12 2011

PROJECT NUMBER: 11-104
PROJECT TITLE: Social Networks, Research Evidence
and Innovation in Health Policymaking
in Burkina Faso

PRINCIPAL INVESTIGATOR: Jessica Shearer
LOCAL PI: Dr. John Lavis

This will acknowledge receipt of your letter dated March 25, 2011 which enclosed revised copies of the Information/Consent Form, Budget and the Protocol for the above-named study. These issues were raised by the Research Ethics Board at their meeting held on March 15, 2011. Based on this additional information, we wish to advise your study has been given *final* approval from the full REB. The submission, Study Protocol and Project Summary, both version dated March 23, 2011 including the Letter of Information/Consent Form version dated March 23, 2011 together with Appendix 3: Telephone Script, Appendix 4: Survey Instrument and Appendix 5: Interview Guide, all version dated March 23, 2011 were found to be acceptable on both ethical and scientific grounds. **Please note** attached you will find the Information/Consent Form with the REB approval affixed; all consent forms used in this study must be copies of the attached materials.

We are pleased to issue final approval for the above-named study for a period of 12 months from the date of the REB meeting on March 15, 2011. Continuation beyond that date will require further review and renewal of REB approval. Any changes or revisions to the original submission must be submitted on an REB amendment form for review and approval by the Research Ethics Board.

The Hamilton Health Sciences/McMaster Health Sciences Research Ethics Board operates in compliance with and is constituted in accordance with the requirements of: The Tri-Council Policy Statement on Ethical Conduct of Research Involving Humans; The International Conference on Harmonization of Good Clinical Practices; Part C Division 5 of the Food and Drug Regulations of Health Canada; and the provisions of the Ontario Personal Health Information Protection Act 2004 and its applicable Regulations.

PLEASE QUOTE THE ABOVE-REFERENCE PROJECT NUMBER ON
ALL FUTURE CORRESPONDENCE

Sincerely,

Suzette Salama PhD,
Interim Chair, Research Ethics Board

OS/KDF

MINISTÈRE DE LA SANTÉ
SECRETARIAT GÉNÉRAL



BURKINA FASO
Unité - Progrès - Justice

N°2011 **0.1393** /MS/SG/DEP.

Ouagadougou, le 04 JUL 2011

Objet : Autorisation recherche.

Réf. :

*Le Secrétaire Général
du Ministère de la Santé*

A

Mademoiselle Jessica Shearer
Candidate au doctorat
McMaster University
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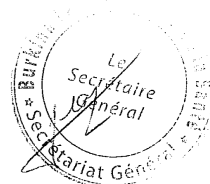
Mademoiselle,

Suite à votre demande d'autorisation de recherche relative au thème :
« **Réseaux sociaux, bases factuelles issues de la recherche et innovation dans l'élaboration des politiques de santé au Burkina Faso** », j'ai l'honneur de vous informer que je marque mon accord pour l'obtention de données nécessaires à sa réalisation.

Une copie des résultats de cette recherche devra obligatoirement être remise à la Direction de la recherche pour la santé.

Je vous prie d'agréer, **Mademoiselle**, l'expression de mes salutations distinguées.

Ampliation
- CAB (ATCR)



Docteur Souleymane SANOU.-
Chevalier de l'ordre national