WHERE THE RUBBER MEETS THE ROAD:
A MIXED-METHOD STUDY OF MIDDLE MANAGERS’ ROLE IN INNOVATION IMPLEMENTATION IN HEALTH CARE ORGANIZATIONS

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A large gap exists between evidence and practice in health care organizations. Researchers in other industries regard middle managers as key players in innovation implementation, but middle managers in health care have a poorly understood role. This study used self-administered survey data and data from semi-structured interviews with sixteen of the middle managers who completed the survey to assess middle managers’ role in innovation implementation in health care organizations. Results indicate that commitment to innovation implementation among middle managers has the potential to improve implementation effectiveness in health care organizations. Middle managers’ commitment cannot be taken for granted, however; it must be fostered. In particular, middle managers’ commitment can be fostered with an infrastructure that supports innovation implementation. Top managers are in a key position to promote such an infrastructure: They can (1) make it known that innovation implementation is a priority in the organization; (2) openly, regularly, and informally communicate with middle managers in specific terms about their implementation-related performance; and (3) ensure that implementation policies and practices have their intended effect (e.g., access to human resources alleviates strains among middle managers).
and that no barriers exist that may limit the positive influence of implementation policies and practices on middle managers’ commitment (e.g., resistance to innovation implementation among providers does not increase strains among middle managers).
DEDICATION

for Ben
ACKNOWLEDGEMENT

The semester before entering the PhD program, I presented my master’s thesis to a committee that included Shoou-Yih Daniel Lee. Daniel filled a specific role on the committee as the organization and delivery expert; I didn’t know him well. Nevertheless, Daniel spent more than an hour with me after my presentation introducing me the art and science of presenting research. Looking back, I imagine that this task was daunting to a teacher even as dedicated as Daniel, given how limited my research experience was. One of Daniel’s greatest challenges, though, proved to be encouraging me to view learning as a journey, not a destination. I focused on deadlines, requirements, and specifications; Daniel urged me to embrace the process, possibilities, and potential. Daniel’s dedication persisted through seemingly endless coursework, anxiety-provoking comprehensive exams, often frustrating proposal development, and the long and arduous process of completing my dissertation. Daniel encouraged me to seek the answers to my own questions, believing that the process would bring me more knowledge than the answer. I feared many times over the years that Daniel had the answer to questions that eluded me; his wisdom suggested that he had all of the answers to all of my questions about things like theory, optimal study design, and even career choice. As it turns out, the answer that could resolve all of my questions was
the only one that Daniel gave to me: I now understand that the answers to my questions lie in
enduring the journey. I have Daniel to thank for this invaluable wisdom. Here’s hoping that our paths on this journey cross many times to come.

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The middle managers whom I studied in this dissertation – particularly those whom I interviewed – agreed to contribute to knowledge regarding how care could be improved in their health centers. Their openness to change is inspiring, and I’m grateful for it.

Many people wondered how I completed a dissertation with a new baby; I wonder how I could have done it without Jane. The anticipation of spending time with Jane sharpened my focus like never before. Jane has always been an inspiration. In fact, many dissertation-related epiphanies came to me during midnight feedings. My dissertation is certainly a great accomplishment, but being Jane’s mother is the greatest accomplishment of all.

Most of all, my sweet, dear husband deserves my gratitude. While my confidence in my intelligence and ability faltered with each setback, Ben’s never did. Every day I think about how incredibly lucky I am to have found a partner so sincerely loving and supportive. This dissertation represents only one benchmark in our journey together; decade one has been a string of exams, study sessions, theses and dissertations. Despite those challenges, Ben made those years lovely. Here’s to the next six decades!

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**TABLE OF CONTENTS**

LIST OF TABLES .......................................................................................................................... x

LIST OF FIGURES ....................................................................................................................... xi

LIST OF ABBREVIATIONS ....................................................................................................... xii

INTRODUCTION .......................................................................................................................... 1

BACKGROUND AND SIGNIFICANCE ...................................................................................... 4

CONCEPTUAL FRAMEWORK AND HYPOTHESIS ................................................................ 20

STUDY DESIGN AND DATA .................................................................................................... 42

QUANTITATIVE RESULTS ...................................................................................................... 77

QUALITATIVE RESULTS ......................................................................................................... 90

DISCUSSION AND CONCLUSION ........................................................................................ 165

APPENDIX 1: Recruitment Phone Call, Consent, and Screening Questions ....................... 197

APPENDIX 2: Interview Guide ................................................................................................. 200

APPENDIX 3: Interview Codes, Descriptions, and Examples .................................................. 206

REFERENCES ........................................................................................................................... 218
LIST OF TABLES

Table 4.4. Variable definitions

Table 5.3. Means, standard deviations, and pairwise correlations

Table 5.4.1. Predictors of community linkage implementation effectiveness: Ordinary least squares regression results

Table 5.4.2. Predictors of self-management implementation effectiveness: Ordinary least squares regression results

Table 5.4.3. Predictors of delivery system design implementation effectiveness: Ordinary least squares regression results

Table 5.4.4. Predictors of middle manager support for innovation implementation: Ordinary least squares regression results

Table 6.2. Descriptive statistics from Aim 1 surveys for middle managers included in Aim 2 interviews

Table 6.5.1. IP&P identification among interviewed middle managers

Table 6.5.2. Moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation
LIST OF FIGURES

Figure 2.2. Determinants of implementation effectiveness (Klein and Sorra, 1996)

Figure 3. Theoretical framework for middle managers’ role in innovation implementation

Figure 4.1. Mixed methods sequential design procedures

Figure 4.2. Health Disparities Collaborative timeline

Figure 4.3. Criteria for inclusion in qualitative study
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BPHC</td>
<td>Bureau of Primary Health Care</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
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<tr>
<td>CFIR</td>
<td>Consolidated Framework for Implementation Research</td>
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<tr>
<td>FQHC</td>
<td>Federally qualified health center</td>
</tr>
<tr>
<td>HDC</td>
<td>Health Disparities Collaborative</td>
</tr>
<tr>
<td>IP&amp;Ps</td>
<td>Implementation policies and practices</td>
</tr>
<tr>
<td>MD</td>
<td>Medical Director</td>
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<tr>
<td>NCQA</td>
<td>National Committee for Quality Assurance</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary least squares regression</td>
</tr>
<tr>
<td>PECS</td>
<td>Patient Electronic Care System</td>
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<tr>
<td>QI</td>
<td>Quality improvement</td>
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<td>SE</td>
<td>Standard error</td>
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<td>VIF</td>
<td>Variance inflation factor</td>
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CHAPTER 1

INTRODUCTION

A gap exists in the United States between evidence regarding effective care and practice (McGlynn, et al., 2003; Stevens et al., 2010). One study found that participants received just half of recommended preventive care, acute care, and care for chronic conditions; some participants received care that was not recommended and was potentially harmful (McGlynn et al., 2003). Further, disparities in access to care and health outcomes exist among racial and ethnic minorities, low-income Americans, and women: In comparison with whites, racial and ethnic minorities suffer from higher rates of diseases such as cancer, obesity, and AIDS (Halle, Lewis, & Sheshamani, 2009). And, despite recent concerns about disparities in cardiovascular care, men continue to receive better treatment for heart disease than women (Agency for Healthcare Research and Quality, 2004). Many of these disparities can be attributed to failure to receive evidence-based care.

The gap between evidence and practice in health care organizations may be attributed in part to poor implementation of quality improvement efforts. Indeed, recent empirical studies have estimated implementation rates of quality improvement initiatives to be less than 50 percent (Burstin et al., 1999; Li et al., 2004; McGlynn et al., 2003). Poor implementation
rates may be due to the substantial organizational changes required for the initiatives (Alexander, 2008). Several empirical studies have attempted to identify critical success factors for implementation. Most recently, studies have focused on a poorly understood aspect of implementation effectiveness: the intersection between an organization’s strategic decision to adopt a quality improvement initiative and its effort to implement it (Helfrich, Weiner, McKinney, & Minasian, 2007). Largely overlooked in extant research, however, are middle managers – the very employees who translate strategy into practice through implementation (Noble, 1999). Middle managers mediate between strategy and day-to-day activities (Uyterhoeven, 1972) by “selling issues” to organizational members (Dutton & Ashford, 1993; Schilit & Locke, 1982), synthesizing information for key organizational members (Dutton & Ashford, 1993; Nonaka, 1994), and creating knowledge through social networks (Bartlett & Ghoshal, 1993; Dopson & Stewart, 1990; Huy, 2001). The specific role of middle managers in the implementation of innovations in health care organizations is poorly understood.

This study contributes to extant research on implementation effectiveness in health care organizations by shedding light on the role of middle managers. In so doing, it identifies high-leverage ways for health care organizations to facilitate the translation of evidence into practice. The specific aims of this study are:

**Aim 1: To assess the relationships among implementation policies and practices (IP&Ps), middle managers’ commitment to innovation implementation, and implementation effectiveness in health care organizations.** This study used regression analysis to assess relationships between (a) IP&Ps and the commitment of middle managers, and (b) middle managers’ commitment and implementation effectiveness. The sample
consisted of middle managers who worked in health centers located in the Midwest and West Central regions of the United States and who participated in the implementation of the HDC, an innovation in chronic disease care.

**Aim 2: To enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations.** This study conducted semi-structured interviews with sixteen of the middle managers included in Aim 1 to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. Template analysis (N. King, 1998), which identifies some themes a priori from interview questions and allows additional themes to emerge as analysis proceeds, was used for Aim 2.
CHAPTER 2
BACKGROUND AND SIGNIFICANCE

2.1. Middle managers are largely overlooked in extant health services implementation effectiveness research

A frequently studied antecedent of implementation effectiveness in health care organizations is commitment to innovation implementation. The relationship between implementation effectiveness and the commitment of middle managers in health care organizations, however, has received little attention. Literature investigating the relationship between commitment to innovation implementation and implementation effectiveness in health care organizations generally falls into one of three categories: (1) The majority has focused on top managers’ and providers’ commitment to innovation implementation, ignoring middle managers’ role. (2) Many others have acknowledged that middle managers may somehow influence implementation effectiveness, but they have taken for granted middle managers’ commitment to innovation implementation. (3) A few scholars have emphasized that middle managers’ commitment to innovation implementation cannot be taken for granted; however, these scholars have not empirically studied the relationship between middle managers’ commitment to innovation implementation and implementation
effectiveness. My study fills this gap in the literature by empirically assessing the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness in health care organizations.

2.1.1. Extant research focuses on top managers’ and providers’ commitment to innovation implementation

The majority of scholars has focused on top managers’ and providers’ influence on implementation effectiveness and failed to consider middle managers’ role in implementation effectiveness. Early research focused on the role of providers in implementation (Kralovec, 1990). Providers’ commitment to communication skills training, evidence-based practices, and depression QI initiatives has been identified as a key facilitator of implementation effectiveness (Fischer, Solberg, & Zander, 2001; Levinson et al., 2002; Palinkas et al., 2008). Helfrich and colleagues (2007) found that physicians’ commitment to new programs in cancer prevention and control research promoted innovation implementation among frontline employees, contributing to a favorable implementation climate, which in turn increased implementation effectiveness. Most recently, Aarons, Sommerfeld and Walrath-Greene (2009) found that organizational support for implementation improved mental health service providers’ attitudes toward evidence-based practice implementation, and Flanagan, Ramanujam, and Doebbling (2009) found that training resources such as academic detailing, grand rounds presentations, and clinical meetings increased providers’ acceptance of clinical practice guidelines. Conversely, provider resistance has been identified as a key barrier to implementing QI initiatives in health care organizations such as community mental health agencies (Blumenthal & Kilo, 1998; Proctor et al., 2007).
Subsequent research broadened its scope to investigate the influence of top managers’ commitment on implementation effectiveness (e.g., Blumenthal & Kilo, 1998). Levinson and colleagues (2002), for example, noted that top managers’ commitment was a critical facilitator of communication skills training implementation. Kimberly and Cook (2008) suggested that top managers’ commitment was likely to influence the effectiveness of innovation implementation in mental health services. Empirical research has borne out this notion: Weiner, Shortell and Alexander, for example, demonstrated that in addition to physician leadership, top managers’ commitment had a positive, significant effect on the extent of clinical involvement in hospital QI efforts. Solberg and colleagues (2000) identified 87 factors influencing clinical guideline implementation effectiveness, including several factors that alluded to the importance of the interface between strategy and frontline implementation (e.g., implementer involvement in development of guideline); however, middle managers – the very employees who translate strategy into action – were overlooked in Solberg and colleagues’ list of factors influencing clinical guideline implementation effectiveness. Top managers’ commitment has also been shown to improve providers’ attitudes toward innovation implementation and to facilitate the implementation of a depression QI initiative (Aarons, 2006; Fischer, Solberg, & Zander, 2001). Top managers’ commitment was the most commonly cited implementation facilitator cited in Fremont and colleagues’ (2006) study of HIV collaboratives in Veterans Health Administration organizations. Similarly, in their study of the implementation of new programs in cancer prevention and control research, Helfrich and colleagues (2007) found that top managers’ commitment contributed to implementation policies that promoted a favorable implementation climate, which in turn increased implementation effectiveness. Proctor and
colleagues (2007) provided a particularly good example of the marked focus on top managers in research on implementation effectiveness in health care organizations: In a study of facilitators and barriers to implementing evidence-based practices, Proctor and colleagues interviewed mental health agency directors. The directors cited their own support as a primary facilitator. Despite broadening their scope to include top managers’ commitment in studies of implementation effectiveness in health care organizations, health services researchers maintained focus on providers and top managers to the exclusion of middle managers.

Some authors have emphasized that implementation effectiveness depends on the ability and willingness of individuals to implement them on the frontlines; however, these authors have failed to acknowledge middle managers’ role in implementation effectiveness (Blumenthal & Kilo, 1998; Shortell, Bennett, & Byck, 1998; Solberg et al., 2000). Tucker and colleagues (2007a, 2007b), for example, empirically assessed the roles of frontline employees and project teams in implementing new practices in hospitals. The authors acknowledged that middle managers supervise these employees and project teams, and they made recommendations of how middle managers can promote the involvement of frontline employees and project teams in implementation; however, neither of these papers empirically assessed the role of middle managers in innovation implementation in health care organizations.

2.1.2. Extant research takes for granted middle managers’ commitment to innovation implementation
Some scholars have acknowledged that middle managers may somehow influence implementation effectiveness, but they have taken for granted middle managers’ commitment to innovation implementation. In a recent commentary, Freed (2005) suggested that lack of proper frontline management can stymie hospital turnarounds. Some empirical research has borne out middle managers’ influence on implementation effectiveness in health care organizations. In their study of middle managers’ involvement in health care organizations’ strategy processes, for example, Floyd and Wooldridge (1997) found that middle managers’ boundary-spanning position allowed them to influence their superiors as well as frontline employees. Middle managers’ influence on frontline employees, they concluded, was positively related to organizational outcomes such as effectiveness, competitive position, efficiency, and financial performance. Despite this attention to middle managers’ role in health care organizations, Floyd and Wooldridge (1997) took for granted that middle managers were wholly committed to implementing top managers’ strategy. Similarly, King and Zeithaml (2001) found that middle managers in hospitals who were privy to information regarding their organization’s competitive advantage were able to convey the information to appropriate employees throughout the organization. Like Floyd and Wooldridge (1997), however, King and Zeithaml (2001) did not question middle managers’ willingness to implement strategies that might contribute to their competitive advantage. In a theory-building study of implementing a new management system in the UK’s National Health System, Currie and Proctor (2005) assessed the perspectives of top managers, policy-makers, and physicians regarding middle managers’ role in strategy development. Currie and Proctor (2005) described middle managers as having a variety of strategic contributions but also took for granted their commitment to implementing the new management strategy.
2.1.3. **Current literature on middle managers’ commitment to innovation implementation is not empirical**

A few scholars have emphasized that middle managers’ commitment to innovation implementation cannot be taken for granted; however, these scholars have not empirically studied the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness. Dopson and Fitzgerald (2006), for example, brought into question middle managers’ ability or willingness to commit to evidence-based practice implementation in health care organizations based on reflections from their previous studies. The authors suggested that lack of knowledge, time, or pressure to meet other requirements may limit middle managers’ commitment. Although they concluded that middle managers’ commitment might influence implementation effectiveness, Dopson and Fitzgerald did not empirically study the relationship. Tucker and Singer (2009) empirically assessed the role of middle managers in process improvement; however, their study related to middle managers’ influence on organizational climate, a broad construct that does not relate to the specific task of implementation (Weiner, 2010). Indeed, to the best of my knowledge, my study is the first to empirically assess the relationship between middle managers’ commitment and implementation effectiveness in health care organizations.

2.2. **Middle managers’ role in innovation implementation in health care organizations**

Klein and Sorra (1996) defined implementation effectiveness as the consistency and quality of employees’ use of an innovation. Their theoretical model of implementation effectiveness suggests that implementation climate and the fit between the innovation and
employees’ values influence implementation effectiveness. Implementation climate was defined as employees’ “shared summary perceptions of the extent to which their use of a specific innovation is rewarded, supported, and expected within an organization.” Klein and Sorra argued that implementation climate engenders skills, incentives, and catalysts for innovation implementation; they argued that innovation-values fit promotes commitment to innovation implementation among employees.

In a 2001 paper, Klein, Conn and Sorra used an empirical study to revise and test their model of implementation effectiveness. The revised model suggests that implementation effectiveness is determined by implementation climate, which, in turn, is determined by implementation policies and practices (IP&Ps); IP&Ps, the authors posited, are determined by financial resource availability and management support (see figure 2.2).

Neither the 1996 nor the 2001 model of implementation effectiveness explicitly accounts for the role of middle managers; however, Klein and her colleagues frequently implied that middle managers have a role in innovation implementation that is distinct from that of top managers or frontline employees. Klein, Conn and Sorra (2001) argued that management support influences IP&Ps. The theoretical background and evidence that they provided suggest that the management support construct refers to the support of top managers, not middle managers. For example, the authors quoted Kilmann and Covin (1988): “With top management behind the effort, the necessary resources and commitment to conduct transformation will be available” (emphasis added). Further, citing Nutt’s 1986 study, they described managers as “creating rationales for action” and investing in IP&Ps; such strategic decisions typically are in the purview of top managers. In contrast, middle managers translate
top managers’ strategy into practice, supporting frontline employees in implementing innovations.

Klein and her colleagues also distinguished middle managers from frontline employees, indicating that frontline employees are subordinate to middle managers. This vertical relationship, they argued, has important implications for implementation effectiveness. Klein and Sorra (1996) suggested that higher authority groups of employees may persuade lower authority groups to use an innovation or resist it. The authors suggested that these higher authority groups can neither be classified as top managers nor frontline employees: Top managers make the decision to adopt an innovation, and middle managers are subject to top managers’ decisions; however, middle managers have the ability to influence frontline employees’ use or resistance to the innovation. In sum, Klein and her colleagues did not explicitly account for the role of middle managers in the implementation effectiveness model; however, it is clear that they conceived of middle managers as having a role in innovation implementation that is distinct from that of top managers or frontline employees.

Klein and colleagues’ few references to middle managers suggest that middle managers may influence implementation climate, translating IP&Ps into practice. Figure 2.2 demonstrates how middle managers may fit into Klein, Conn and Sorra’s (2001) conceptual framework. Some scholars’ research offers insight into how middle managers might influence implementation climate in health care organizations. I discuss their contributions below.
Theoretical mechanism for the relationship between middle managers’ commitment and implementation effectiveness.

Implementation climate represents a composite of employees’ perceptions of various IP&Ps. Klein, Conn and Sorra (2001) asserted that a supportive implementation climate increases implementation effectiveness. The construct accounts for Klein, Conn and Sorra’s theory that IP&Ps are cumulative (i.e., the more the better), compensatory (i.e., good IP&Ps can compensate for bad ones), and equifinal (i.e., multiple combinations of IP&Ps can result in similarly supportive or unsupportive implementation climates). The implementation climate construct limits researchers’ search for a single set of universally effective IP&Ps. Instead, the construct encourages researchers to focus on the extent to which employees perceive that innovation use is rewarded, supported, and expected in their organization (Weiner, 2010). In sum, implementation climate refers to employees’ “shared perceptions of the extent to which their use of a specific innovation is rewarded, supported, and expected within their organization” (Klein & Sorra, 1996). Middle managers may influence implementation effectiveness by contributing to employees’ perceptions of their organization’s implementation climate.

Six studies have empirically assessed the relationship between implementation climate and implementation effectiveness, and each of the studies has found the relationship to be
statistically significant (Dong, Neufeld, & Higgins, 2008; Helfrich, Savitz, Swiger, & Weiner, 2007; Holahan, Aronson, Jurkat, & Schoorman, 2004; Klein, 1984; Klein et al., 2001; Osei-Bryson, Dong, & Ngwenyama, 2008). Although some of these studies have substantial limitations, they offer insight into the potential influence middle managers may have on implementation climate. Klein, Conn and Sorra (2001), for example, suggested that a positive implementation climate may facilitate implementation effectiveness by “building employees’ recognition and acceptance of the importance of innovation implementation.” Since middle managers interact with frontline employees on a daily basis, they may be in a position to influence frontline employees’ recognition (Osei-Bryson et al., 2008). Similarly, Holahan and colleagues (2004) found that implementation climate fully mediated the relationship between organizational receptivity toward change and implementation effectiveness. Given their daily interactions with frontline employees, middle managers are likely to have many opportunities to influence organizational receptivity toward change and, therefore, implementation climate. Indeed, Klein (1984) found that foremen who bad-mouthed an innovation in manufacturing plants deterred their subordinates from using the innovation. Osei-Bryson and colleagues (2008) concluded that a supportive implementation climate may require managers to explain changes in daily tasks to frontline employees. Middle managers – not top managers – have the knowledge necessary to identify changes for frontline employees. Finally, in their study of the implementation of new cancer prevention and control research programs in cancer clinical research networks, Helfrich and colleagues (2007) concluded that implementation climate is a critical component of the implementation effectiveness model because no single combination of IP&Ps is effective for all innovations in all organizations. Instead, the authors argued, IP&Ps are highly contextual; an organization
changes even as it seeks to adapt the innovation for its purposes. Again, middle managers typically negotiate these daily changes and adaptations, so they may be in a key position to influence implementation climate (Uyterhoeven, 1972).

2.3. Research on middle managers’ role in innovation implementation in other industries

Many industries regard middle managers as key players in innovation implementation (Floyd & Wooldridge, 1994; Klein et al., 2001). Floyd and Wooldridge (1994) suggested that committed middle managers influence innovation implementation through championing innovations, synthesizing information for frontline employees, facilitating frontline employees’ adaptability, and translating organizational strategy into “business as usual.” Middle managers’ commitment to innovation implementation has been linked to positive organizational outcomes such as profit growth (Mair, 2005), enhanced competitiveness (Maritan & Brush, 2003), and overall effectiveness in reaching established goals (Floyd & Wooldridge, 1997), as well as organizational processes, such as strategy realization (Floyd & Wooldridge, 1992), efficiency of operations (Floyd & Wooldridge, 1997), and implementation speed (Maritan & Brush, 2003). Specifically, middle managers influence implementation effectiveness by (1) “selling issues” such as innovation implementation to frontline employees, (2) synthesizing information for frontline employees, (3) creating knowledge through social networks, and (4) mediating between strategy and day-to-day activities.

Middle managers “sell issues” such as innovation implementation to frontline employees (Dutton & Ashford, 1993). Middle managers’ influence may be downward – “rallying the
troops” of frontline employees to embrace innovation implementation – or upward – encouraging top managers to address concerns that they have regarding innovation implementation (Schilit & Locke, 1982). For example, Rouleau (2005) found that middle managers in a Canadian clothing manufacturing organization were able to “sell” innovation implementation to frontline employees, and Ogbonna and Wilkinson (2003) found that middle managers in a food retail company considered encouraging frontline employees to embrace an innovation to be central to their role. Mantere (2005) found that middle managers in European professional service influenced both the opinions and activities of frontline employees and their supervisors through daily conversations. These conversations also allowed middle managers to continuously negotiate their own role and responsibilities.

Middle managers also synthesize information for employees (Dutton & Ashford, 1993). Nonaka (1994) argued that knowledge is created through a “continuous dialogue between tacit and explicit knowledge.” Middle managers, many scholars have suggested, reside at the crux of tacit and explicit knowledge: Middle managers translate explicit knowledge associated the innovations that top managers would like implemented into tacit knowledge that middle managers can use to implement innovations. Dopson and Stewart (1990), for example, found that middle managers in manufacturing and public sector organizations had a unique vantage that made them privy to issues in several departments within the organization and outside the organization. As a result, middle managers were able to translate information for frontline employees. Middle managers in textile companies who were privy to information regarding key mechanisms for their organization’s competitive advantage were able to contribute to their organization’s success by conveying that information to appropriate employees throughout the organization (A. W. King & Zeithaml, 2001). Mantere
Middle managers create knowledge regarding innovation implementation through social networks. Middle managers’ proximity to day-to-day operations and frontline employees allow them to leverage informal organizational networks by staying attuned to frontline employees’ moods and emotional needs; these networks allow middle managers to inform frontline employees of the need for innovation implementation and obtain their support (Huy, 2001). Middle managers’ adept use of social networks has also been attributed to their generalist skills, which allow them the flexibility and adaptability required to translate broad strategy into concrete tasks for implementation (Dopson & Stewart, 1990). Barlett and Ghoshal (1993) noted that middle managers serve not only as vertical links between top managers and frontline employees, but also as horizontal links, helping to diffuse information throughout an organization. For example, middle managers in a utility company helped frontline employees to make sense of changes associated with implementing an innovation through role modeling, managing frontline employees’ resistance, coaching, and training (Balogun, 2003).

Middle managers also mediate between strategy and day-to-day activities. Mintzberg (1973) found that informational roles are critical aspects of managing. Indeed, Uyterhoeven (1972) suggested that middle managers assume the “bilingual” role of translating top managers’ strategy into frontline employees’ actions. Specifically, middle managers translate explicit knowledge associated the innovations that top managers would like implemented into tacit knowledge that frontline employees can use to implement innovations; middle managers’ unique access to information regarding strategy and knowledge of frontline
operations allow them to translate strategy into action (Nonaka, 1994). Indeed, Kanter (1982) found that middle managers carry out strategy in part by encouraging frontline employees to redirect their attention; middle managers do this by reminding frontline employees of the benefit of implementing an innovation and giving them feedback on their innovation implementation-related performance. Specifically, middle managers’ strategic location in social networks may afford them the ability to translate top managers’ strategy into frontline employees’ actions. Kodama (2005), for example, found that middle managers in technology firms transcended divisional barriers to form “strategic communities.”

Middle managers may positively or negatively influence innovation implementation. Early commentary and research largely suggested that middle managers could significantly hamper innovation implementation. For example, organizational turnaround strategists cautioned that innovation implementation may fail in the hands of resistant middle managers (Dutton & Ashford, 1993). Indeed, Floyd and Wooldridge (1992) found that middle managers impeded innovation implementation by “dragging their feet” or pursuing other priorities. Sayer (1998) discussed how middle managers revolted against the implementation of an innovation in a public sector organization to maintain their position and power, effectively bringing implementation as originally conceived by top managers to a halt. Huy (2002) similarly found that insufficient middle manager commitment resulted in poor implementation in an information technology firm. Middle manager resistance has also been cited as the primary obstacle to implementing lean practices in manufacturing firms (Danford, 2007). Ogbonna and Wilkinson (2003) found that middle managers in a food retail company who had concerns regarding an innovation implemented the innovation only out of fear of sanction from top managers. The authors warned that this culture of fear may lead to
unintended consequences such as demoralization and diminishing performance in other aspects of middle managers’ jobs.

Over time, the notion that middle managers are likely to impede innovation implementation has become conventional wisdom. Even recently, Ford, Ford, and D’Amelio (2008) warned that resistance to change among change recipients such as middle managers who receive change orders from top managers may manifest in inaction or subversion; middle managers may fail to rally frontline employees around innovation implementation, they suggested, effectively curtailing it. And yet, as described in detail above, many scholars have found that middle managers are conduits to change. Despite differing perspectives regarding middle managers’ propensity to positively or negatively influence implementation effectiveness, scholars in many industries other than health care agree that middle managers’ commitment is a critical determinant of implementation effectiveness.

2.4. Scope of this study

This study contributes to extant research on implementation effectiveness in health care organizations by empirically studying middle managers’ role. Middle managers’ commitment to innovation implementation may enable health care providers to deliver the highest quality patient care. High quality care benefits not only patients, but also employees in health care organizations, payers, and communities through decreased costs and improved access to care (Chassin, Galvin, & the National Roundtable on Health Care Quality, 1998; Donabedian, 1988). The goal of this study was to understand relationships among IP&Ps, middle managers’ commitment to innovation implementation, and implementation effectiveness in health care organizations.
2.5. Summary and significance

The rate of successful implementation of health care innovations is dismal (Alexander, 2008). Health services researchers have paid little attention to middle managers’ role in innovation implementation. As team work designs become popular in health care organizations (Blancett & Flarey, 1995), and as middle managers increasingly oversee initiatives, middle managers’ influence over the implementation process grows (Bourne & Walker, 2005). The omission of middle managers from research on health care innovation implementation is particularly problematic because middle managers in health care organizations are unique: Many middle managers are promoted based on clinical skills but may lack adequate skills to run a department or service area upon assuming the management position (Federico & Bonacum, 2010), and middle managers’ role in innovation implementation in health care organizations may differ from the role of middle managers in other industries because, for example, middle managers in health care organizations often assume their role in addition to clinical or other administrative responsibilities. Understanding their role in innovation implementation is critical for improving implementation effectiveness.

The goal of the study was to understand the role of middle managers in innovation implementation in health care organizations. In achieving this goal, the study advances knowledge regarding a poorly understood aspect of innovation implementation in health care organizations. The study also identifies high-leverage ways for health care organizations to facilitate the translation of evidence into practice.
CHAPTER 3
CONCEPTUAL FRAMEWORK AND HYPOTHESIS

This study explored the role of middle managers in the implementation of innovations in health care organizations. Specifically, I hypothesized that middle managers’ commitment to innovation implementation increases implementation effectiveness. Further, I hypothesized that implementation policies and practices (IP&Ps) increase middle managers’ commitment to innovation. Two primary theories drive these hypotheses. First, the theory of implementation effectiveness, originally developed to understand innovation implementation in a manufacturing setting and later adapted for health care organizations, explains how middle managers’ commitment to innovation implementation increases implementation effectiveness (Helfrich, Weiner et al., 2007; Klein et al., 2001; Klein & Sorra, 1996). Second, the theory of perceived organizational support, a social exchange interpretation of organizational commitment, explains how IP&Ps increase middle managers’ commitment to innovation implementation. Each of these theories and related hypotheses are described in turn below. Figure 3 visually depicts the conceptual framework and hypotheses regarding middle managers’ role in innovation implementation.
Figure 3. Theoretical framework for middle managers’ role in innovation implementation*

*Based on the theory of perceived organizational support (Eisenberger, Huntington, Hutchison, & Sowa, 1986) and the theory of implementation effectiveness (Klein et al., 2001). Control variables that were included in analyses have been omitted from this figure.
3.1. The relationship between middle managers’ commitment to innovation implementation and implementation effectiveness

Evidence is translated into practice when innovations are effectively implemented. An innovation is “an idea, practice, or object that is perceived as new by an individual or another unit of adoption” (Rogers, 2003). For example, the Health Disparities Collaborative (HDC) was a six-year Bureau of Primary Health Care initiative that began in 1999 and was specifically designed to reduce health disparities in federally qualified health centers (Chin et al., 2004). The HDC was an innovation in health care because it was a distinct, major initiative that employed strategies unfamiliar to health center employees (Chin et al., 2004). Implementation is “the transition period during which targeted organizational members ideally become increasingly skillful, consistent, and committed in their use of an innovation” (Klein & Sorra, 1996). Implementing the HDC, for instance, involved becoming familiar with and beginning to integrate the chronic care model (Wagner, Austin, & Von Korff, 1996) and Plan-Do-Study-Act cycles into their health centers. For many health centers, this involved establishing linkages with community resources, improving self-management among patient populations with the disease state of interest (e.g., diabetes), and redesigning care delivery systems to improve care. Innovation implementation, then, refers to the period during which organizational members become proficient in their use of a new practice.

Implementation effectiveness is a multidimensional construct that includes reach (appropriateness), dose of innovation delivered (consistency), dose of innovation received (consistency), and level of integration (fidelity) (Linnan & Steckler, 2002). In this study, I was particularly interested in the level of integration of an innovation’s components into an organization’s practices (fidelity); the level of integration is indicative of an organization’s
potential to achieve an innovation’s intended outcomes (Moncher & Prinz, 1991; Rogers, 2003), and I am interested in assessing middle managers’ role in contributing to health care organizations’ potential to achieve the intended outcomes of innovations such as the chronic care model. For example, an organization that has effectively integrated the elements of the chronic care model has the potential to improve chronic disease management (Bodenheimer, Wagner, & Grumbach, 2002a, 2002b). The presence of community linkages, for instance, is one indication that the chronic care model has been effectively implemented in a health care organization; linking patients with community-based resources such as senior centers and exercise programs allows patients to benefit from resources that are not available within many health care organizations.

*Commitment* refers to attachment to an entity that tends to encourage behaviors intended to benefit that entity, such as effort toward meeting organizational goals like implementing an innovation intended to improve care for patients with chronic diseases (J. P. Meyer, Stanley, Herscovitch, & Topolnytsky, 2002). Of particular interest in this study is middle managers’ commitment to *innovation implementation*: To positively influence implementation effectiveness, middle managers must be compelled to engage in behaviors that promote the effective implementation of innovations. For example, middle managers demonstrated effort toward implementing the HDC in their health centers through regular use of a listserv, virtual classroom, and web page; these are instruments that are intended to provide access to social networks that may promote implementation effectiveness (Wagner et al., 2001). An HDC listserv, for instance, offers middle managers the opportunity to post questions to middle managers in other health centers regarding HDC implementation, share success stories regarding approaches to the HDC that worked in their health centers, and
offer suggestions to other middle managers regarding how they might solve HDC implementation-related problems. As such, a middle manager who regularly uses an HDC listserv demonstrates commitment to implementing the HDC because doing so indicates proactivity in identifying solutions to innovation implementation-related problems. Note that the regular use of an HDC listserv, virtual classroom, and web page represent commitment to HDC implementation, not HDC implementation effectiveness; rather, the integration of the HDC’s components (e.g., patient self-management, community linkages, and efficient care delivery systems) into an organization’s practices represent HDC implementation effectiveness. In contrast, the regular use of an HDC listserv, virtual classroom, and web page are methods that middle managers may use to promote integration of the HDC’s components. For example, a middle manager may use an HDC listserv (commitment to innovation implementation) to solicit ideas about how to empower clinicians to effectively link patients with community-based resources such as senior centers and exercise programs (implementation effectiveness). In this example, HDC listserv use represents a middle manager’s commitment to establishing linkages with community-based resources, and linkages with community-based resources suggest that the HDC has been effectively implemented.

The theory of implementation effectiveness does not explicitly account for middle managers’ role in innovation implementation. As discussed in detail in Chapter 2, however, Klein and colleagues’ (1996, 2001) few references to middle managers suggest that middle managers may influence implementation climate, translating innovations into practice. Some scholars’ research provides insight into how middle managers might influence implementation climate in health care organizations. Specifically, scholars have consistently
found statistically significant relationships between implementation climate and implementation effectiveness (Dong et al., 2008; Helfrich, Savitz et al., 2007; Holahan et al., 2004; Klein, 1984; Klein et al., 2001; Osei-Bryson et al., 2008). Many of these scholars concluded that building a supportive implementation climate requires close and frequent interaction with the frontline employees who are tasked with implementation. Since they interact with frontline employees on a daily basis (Uyterhoeven, 1972), middle managers may be in a particularly good position to influence frontline employees’ perceptions of implementation climate.

Indeed, as discussed in detail in Chapter 2, scholars in industries other than health care have identified middle managers as key players in innovation implementation (e.g., Floyd & Wooldridge, 1994; Klein et al., 2001). Specifically, these scholars have suggested that middle managers “sell issues” such as innovation implementation, synthesize information for key employees, create knowledge through social networks, and mediate between strategy and day-to-day activities; in turn, each of these activities may influence implementation effectiveness. Some health services researchers have suggested that implementation effectiveness may depend on middle managers’ commitment to innovation implementation (Dopson & Fitzgerald, 2006), but they have not empirically studied the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness in health care organizations; my study is the first to so. My first research question is: What is the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness? My first hypothesis is:

*Hypothesis 1: Middle managers’ commitment to innovation implementation is positively related to implementation effectiveness.*
3.2. The relationship between IP&Ps and middle managers’ commitment to innovation implementation

If middle managers’ commitment to innovation implementation increases implementation effectiveness, then identifying factors that increase middle managers’ commitment to innovation implementation has the potential to improve implementation effectiveness; by motivating middle managers’ commitment, these factors can be leveraged to increase implementation effectiveness.

The theory of perceived organizational support (Rhoades & Eisenberger, 2002) is a social exchange interpretation of organizational commitment that provides a framework for understanding how IP&Ps may increase middle managers’ commitment to innovation implementation. Its premise is that employees anthropomorphize their organizations, attributing the actions of organizational agents (e.g., top managers) to the organization’s intent instead of organizational agents’ will (H. Levinson, 1965). Organizational agents’ actions are often responses to the organization’s legal, financial, and moral responsibilities, and its policies, practices, and culture. Furthermore, employees who anthropomorphize their organizations view organizational agents’ actions as an indicator of the extent to which their organization favors them. For example, top managers may distribute incentives to middle managers whose teams achieve QI goals. Instead of attributing the incentives to supportive IP&Ps, middle managers may attribute the incentives to top managers. As a result of this anthropomorphizing, employees may develop affective attachment to innovation implementation in organizations that offer IP&Ps because IP&Ps are a sign that their organization cares about the innovation. For example, performance reviews about
implementation-related performance (an IP&P) signal to middle managers that good performance related to innovation implementation is important to the organization.

This affective attachment may cause employees to reciprocate the organization’s favorable treatment with greater effort toward meeting organizational goals such as innovation implementation (Eisenberger et al., 1986). For example, middle managers in organizations where top managers create an environment in which innovation implementation is an organizational priority may reciprocate with increased engagement in innovation implementation activities such as seeking advice from other health centers through a listserv. My second research question is: What is the relationship between IP&Ps and middle managers’ commitment to innovation implementation? Figure 3 visually depicts my hypotheses regarding the relationships among IP&Ps, middle managers’ commitment to innovation implementation, and implementation effectiveness. IP&Ps include the following: incentives; performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support. IP&Ps may increase middle managers’ commitment to innovation implementation by signaling to middle managers that their organization cares about the innovation (Eisenberger et al., 1986). In turn, middle managers’ commitment may influence implementation effectiveness (Klein & Sorra, 1996).

*The relationship between IP&Ps and middle managers’ commitment to innovation implementation*

A large body of research suggests that *incentives* may increase commitment to innovation implementation. Incentives that are designed to both motivate behavior that contributes to organizational strategy and serve middle managers’ self-interest may increase middle
managers’ commitment to innovation implementation (Floyd & Wooldridge, 1992). For example, offering career promotion opportunities for active participation in innovation implementation may motivate middle managers to commit to innovation implementation. Incentives are particularly helpful in inducing extra-role behaviors (Kanter, 1982). In health care organizations, incentives may increase commitment to implementing innovations, which often fall outside middle managers’ formal clinical or administrative roles. Indeed, Levinson and colleagues (2002) suggested that monetary or professional development incentives should be used to promote innovation implementation among providers. Aarons and colleagues’ (2009) study findings supported this notion: Financial incentives improved mental health providers’ commitment to evidence-based practice implementation; in turn, commitment to evidence-based practice implementation increased the use of evidence-based practices among providers. Incentives may have a similar effect on middle managers’ commitment to innovation implementation. Offering professional development opportunities to reward middle managers’ implementation-related performance may encourage middle managers to engage in implementation-related activities.

Hypothesis 2a: Incentives are positively related to middle managers’ commitment to innovation implementation.

The relationship between incentives and middle managers’ commitment to innovation implementation is likely to depend on other IP&Ps, including performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support. Without top managers’ support, for example, incentives may have a negative effect on middle managers’ commitment to innovation implementation because middle managers may perceive the incentives as manipulative, not motivational (Deci &
Ryan, 2000). IP&Ps other than incentives represent the love, gratitude, trust and community that are exchanged in a social relationship; whereas incentives extrinsically motivate, other IP&Ps represent an organization’s effort to empower middle managers to effectively carry out their responsibilities (Ariely, 2009). The intrinsic motivation that derives from feeling empowered to carry out one’s responsibilities persists in the absence of extrinsic rewards such as incentives; the extrinsic motivation that extrinsic rewards incite is likely to subside in the absence of incentives. Whereas incentives alone may feel manipulative, when combined with other IP&Ps that signify their organization’s effort to give middle managers the means necessary to implement an innovation, incentives may make the exchange of a middle manager’s work for pay and incentives (a market relationship) and access to other IP&Ps (a social relationship) seem like a bargain well worth committing to. A second component of my hypothesis regarding the relationship between incentives and middle managers’ commitment to innovation implementation, thus, is:

Hypothesis 2b: The relationship between incentives and middle managers’ commitment to innovation implementation depends upon performance reviews*; access to financial, human, and training resources*; local social network involvement*; and top managers’ support*, such that the relationship will be stronger when any of these other IP&Ps are available.

*See below for hypothesized relationships between these variables and middle managers’ commitment to innovation implementation.

Information regarding the adequacy of middle managers’ commitment to innovation implementation in performance reviews about implementation-related performance with top managers may motivate middle managers to commit to innovation implementation. Two
mechanisms may underlie the relationship between performance reviews and commitment to innovation implementation: First, explicit metrics used in performance reviews may give middle managers the information necessary improve and adjust their future commitment to innovation implementation. That is, feedback regarding opportunities to improve performance may enhance commitment to innovation implementation (W. Levinson et al., 2002). Second, performance reviews may allow middle managers to personally engage with top managers regarding their commitment. As Kanter (1982) suggested, performance reviews give top managers the opportunity to remind middle managers of the purpose of innovation implementation and to congratulate middle managers on their success in innovation implementation. In the absence of performance reviews, middle managers may lack the “recursive control practices” necessary to augment their commitment to innovation implementation (Mantere, 2005).

**Hypothesis 3a: Performance reviews are positively related to middle managers’ commitment to innovation implementation.**

The relationship between performance reviews and middle managers’ commitment to innovation implementation is likely to depend on other IP&Ps, including performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support. Middle managers may be unable to act on feedback regarding their innovation implementation-related performance unless they have access to the resources necessary to commit to innovation implementation. Indeed, Blumberg & Pringle (1982) suggested that job performance, such as committing to innovation implementation based on feedback regarding innovation implementation-related performance, depends on an employee’s capacity, willingness, and opportunity. If a middle manager has received
feedback regarding his or her innovation implementation-related performance, then he or she may have the capacity to perform; if the middle manager believes that acting on the feedback is within his or her role, then he or she may have the willingness to perform; if a middle manager lacks IP&Ps, then he or she lacks the opportunity to act on feedback regarding innovation implementation-related performance. For example, during a performance review, a middle manager may receive feedback that he or she does not actively seek assistance in resolving implementation-related problems. If the middle manager lacks access to the financial resources necessary to purchase a computer on which the middle manager might post questions regarding HDC implementation to a listserv comprised of middle managers in other health centers, then the middle manager may not have the opportunity to modify his or her commitment based on feedback received during a performance review. Middle managers may be unwilling to modify their commitment to innovation implementation in response to feedback received during a performance review if they lack support from top managers: For performance reviews to have their intended effect on middle managers’ commitment, middle managers must view top managers as legitimate (i.e., welcoming and supportive); top managers may express their support by regularly providing feedback to middle managers during informal, frequent performance reviews instead of requiring middle managers to account for their implementation-related performance in retrospect – in a formal, annual performance review, for example (Lerner & Tetlock, 1999). A second component of my hypothesis regarding the relationship between performance reviews and middle managers’ commitment to innovation implementation, thus, is:

*Hypothesis 3b: The relationship between performance reviews and middle managers’ commitment to innovation implementation depends upon incentives; access to financial,
human, and training resources*; local social network involvement*; and top managers’ support*, such that the relationship will be stronger when any of these other IP&Ps are available.

*See below for hypothesized relationships between these variables and middle managers’ commitment to innovation implementation.

Klein and colleagues (1996, 2001) conceived of access to financial resources as an antecedent of IP&Ps. Middle managers, however, are likely to view access to financial resources as an IP&P that they can draw upon to support innovation implementation. For example, access to financial resources may enable middle managers to commit to innovation implementation by reducing the amount of time and effort that they would otherwise expend on competing task demands. Indeed, Kanter (1982) suggested that access to financial resources is likely to encourage managers’ commitment to organizational initiatives.

Empirical research has borne out Kanter’s assertion: Alexander and colleagues (2006) identified access to financial resources as an important feature of a supportive organizational context for implementing QI in hospitals; increased access to financial resources was associated with higher levels of commitment to QI. Community-based hospitals and physician groups involved in National Cancer Institute clinical trials with access to financial resources demonstrated commitment to innovation implementation by expanding supportive IP&Ps (Helfrich, Weiner et al., 2007). And in a study of implementing evidence-based mental health practices, community mental health agency directors cited lack of financial resources as a barrier to effective implementation (Proctor et al., 2007). Extant research on the effect of access to financial resources relates to top managers’ and providers’ commitment to innovation implementation; however, middle managers’ commitment to
innovation implementation is also likely to be positively related to access to financial resources. Access to financial resources, for example, may allow middle managers to purchase electronic medical records, automating time-consuming processes such as chart audits, and allowing middle managers to engage in activities that signify commitment to innovation implementation.

_Hypothesis 4: Access to financial resources is positively related to middle managers’ commitment to innovation implementation._

The relationship between access to human resources and commitment to innovation implementation is well-documented. Aarons and colleagues (2009), for example, found that access to human resources improved mental health providers’ attitudes toward the implementation of evidence-based practices. Lack of staffing caused some managers to discontinue efforts to implement innovative mental health practices (Massatti, Sweeney, Panzano, & Roth, 2008). Specifically, managers considering implementing innovative mental health practices indicated that they were unable to commit to the innovation without access to human resources with the skills and expertise necessary to implement the innovation (Seffrin, Panzano, & Roth, 2008). The relationship between access to human resources and commitment to innovation implementation is likely to exist among middle managers. Specifically, access to human resources may give middle managers the ability to commit to innovation implementation by offloading some of their work, giving them the opportunity to engage in activities that demonstrate commitment to innovation implementation. For example, administrative employees in health care organizations schedule patient appointments and manage medical records, enabling providers to deliver health care
innovations and middle managers to promote fidelity to an innovation through increased engagement in implementation-related activities.

*Hypothesis 5: Access to human resources is positively related to middle managers’ commitment to innovation implementation.*

Access to training resources may give middle managers the ability to commit to innovation implementation by offering them the declarative knowledge (what to do), compilation knowledge (integration of facts), procedural knowledge (how to do things), conditional or tacit knowledge (when and why to do things) (Ackerman, Kyllonen, & Morrison, 1991), and meta-cognition (mental processes for acquiring knowledge, interpreting feedback, and learning from experience) (Kanfer, Ackerman, & Sternberg, 1989) needed to engage in activities that demonstrate commitment to innovation implementation (Ackerman et al., 1991). The relationship between access to training resources and commitment to innovation implementation is well-established. Kanter (1982) suggested that middle managers must receive training to ensure that they have adequate information regarding the innovation being implemented. Indeed, Markoff and colleagues (2005) found that access to training resources helped to engage employees involved in implementing trauma-informed, integrated care for women with co-occurring substance abuse and mental health disorders and histories of violence. Aarons and Palinkas (2007) identified access to training resources as a method of engaging employees in implementing evidence-based practices in child welfare. And in a study of implementing evidence-based practices in child mental health, training was used as a method of ensuring providers’ commitment to evidence-based practice implementation; the authors found that training had a significant effect on providers’ commitment to evidence-based practice implementation (Palinkas et al., 2008). The
relationship between access to training resources and commitment to innovation implementation is likely to extend to middle managers. For example, training in information systems may give middle managers the knowledge necessary to engage in activities that signify commitment to innovation implementation such as regular use of a virtual classroom.

*Hypothesis 6: Access to training resources is positively related to middle managers’ commitment to innovation implementation.*

*Local social network involvement* refers to the proportion of facilities in a middle manager’s community that are concurrently engaged in innovation implementation (Granovetter, 1978; Mantere, 2005). Middle managers whose facilities are part of a network of facilities participating in innovation implementation may be more motivated to commit to innovation implementation than middle managers in standalone facilities; widespread participation in an innovation signals to middle managers the importance of committing to innovation implementation (C. B. Meyer, 2006; Wagner et al., 2001). For example, middle managers attending regional learning sessions for a quality improvement collaborative may have the opportunity to interact with middle managers in other facilities, signaling shared value in commitment to the quality improvement collaborative. The relationship between local social network involvement and commitment to innovation implementation among other health care organization employees has been identified in previous research. Floyd and Lane (2000), for example, argued that horizontal interaction exposes middle managers to a variety of opinions and perceptions about the need to change. That is, if a middle manager who was initially reluctant to implement an innovation interacts with another middle manager who has successfully implemented the innovation, the reluctant middle manager may change his or her opinion about innovation implementation. Indeed, Balogun and
Johnson (2004) found that middle managers in a private utility company used lateral social interactions as a means of making sense of strategy implementation in response to changes in the competitive environment. These lateral social interactions are also likely to influence middle managers’ commitment to innovation implementation in health care organizations. My seventh hypothesis, thus, is:

_Hypothesis 7: Local social network involvement is positively related to middle managers’ commitment to innovation implementation._

Like access to financial resources, Klein and colleagues (1996, 2001) conceived of top managers’ support for innovation implementation as an antecedent of IP&Ps (Klein et al., 2001; Klein & Sorra, 1996). Middle managers, however, are likely to view top managers’ support for innovation implementation as an IP&P that they can draw upon to support innovation implementation. For example, _top managers’ support for innovation implementation_ may increase middle managers’ commitment to innovation implementation by inciting behavioral routines that reflect agreeableness toward innovation, openness to change, and the conscientiousness required to commit to innovation implementation (Hofmann & Jones, 2005). Indeed, research has suggested that top managers’ support increases physicians’ commitment to innovation implementation. Blumenthal (1998), for example, found that top managers were concerned about their ability to garner providers’ commitment to QI implementation, and Weiner, Shortell and Alexander (1997) demonstrated that top managers’ support had a positive, significant effect on the extent of clinical involvement in hospital QI efforts.

Top managers’ support for innovation implementation may increase commitment to innovation implementation through several mechanisms. For example, some research has
suggested that top managers’ support improves providers’ commitment to innovation implementation (Fischer, Solberg, & Zander, 2001). Another study found that top managers in organizations implementing new programs in cancer prevention and control research created a climate that promoted commitment to program implementation, such as role-modeling and open communication regarding innovation implementation concerns (Helfrich, Weiner et al., 2007) (W. Levinson et al., 2002). Indeed, several studies have demonstrated that top managers’ support increases commitment to innovation implementation: Proctor and colleagues (2007) found that top managers promoted commitment to evidence-based practices among providers by discussing the merits of the innovation, and Fremont and colleagues (2006) found that top managers were able to enlist the commitment of providers implementing HIV collaboratives in Veterans Health Administration organizations through regular meetings that allowed them to communicate regularly regarding innovation implementation concerns. Top managers’ support may have a similar effect on commitment to innovation implementation among middle managers; the support that fostered commitment to innovation implementation among providers are also likely to foster commitment to innovation implementation among middle managers. For example, middle managers may have the opportunity to redirect their limited time and resources to engaging in implementation-related activities when top managers assist in getting providers to “buy into” innovation implementation.

Hypothesis 8: Top managers’ support for innovation implementation is positively related to middle managers’ commitment to innovation implementation.

3.3. Mediators and moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations
Aim 2 uses qualitative data to explore mediators and moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations that extant research has identified as potentially important (Rhoades & Eisenberger, 2002). The theory of perceived organizational support, for example, suggests potential mediators and moderators of the relationship; these mediators and moderators are described in detail below. I also identify potential mediators and moderators of the relationship between IP&Ps and middle managers’ commitment to HDC implementation that emerged from Aim 2 analyses but were not proposed by the theory of perceived organizational support. The mechanisms and boundary conditions for the relationship between IP&Ps and middle managers’ commitment in health care organizations currently are poorly understood; understanding mediators and moderators will provide a nuanced understanding of how and under what conditions IP&Ps influence middle managers’ commitment. Further, understanding mediators and moderators of the relationship between IP&Ps and middle managers’ commitment will allow practitioners to promote middle managers’ commitment and implementation effectiveness in health care organizations.

The relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations may depend on the conditions under which IP&Ps are offered. Moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations may include (1) whether IP&Ps are under top managers’ control and (2) whether middle managers perceive top managers to be agents of the organization (figure 3). The theory of perceived organizational support suggests that IP&Ps are more highly valued if they are offered based on discretionary choice rather than circumstances beyond the donor’s control (Eisenberger et
al., 1986; Rhoades & Eisenberger, 2002). For example, if an organization is obligated by law to provide the IP&Ps, middle managers may not feel that the favorable treatment is as worthy of reciprocation than if IP&Ps were offered based on organizational policy. Indeed, Eisenberger and colleagues (1997) found that perceived organizational support among employees in a variety of organizations depended upon whether the policies and practices were offered based on the organization’s discretion or in response to external constraints. Employees who perceive their organization as supportive may be more likely to reciprocate with greater effort toward meeting organizational goals such as innovation implementation (Eisenberger et al., 1986), so middle managers who believe that IP&Ps are offered based on the organization’s discretion may exhibit greater commitment to innovation implementation.

The theory of perceived organizational support posits that IP&Ps are more highly valued if employees identify top managers as agents of a benevolent organization as opposed to idiosyncratic actors. Three studies involving employees in a variety of organizations demonstrated that perceived organizational support depended upon the extent to which employees identified top managers with the organization (Eisenberger, Stinglhamber, Vandenberghe, Sucharski, & Rhoades, 2002). That is, employees who believed that top managers acted on behalf of the organization were more likely to believe that help was available to them if they had a problem than employees who believed that top managers’ actions were based on their personal discretion. Since employees who perceive their organization as supportive may be more likely to reciprocate with greater effort toward meeting organizational goals such as innovation implementation (Eisenberger et al., 1986), middle managers who perceive top managers to be agents of their organization may exhibit greater commitment to innovation implementation.
Potential mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations include (1) job involvement (identification with and interest in the specific work one performs), (2) job-related affect (job satisfaction and general mood), and (3) strain (aversive psychological and psychosomatic reactions) (Rhoades & Eisenberger, 2002) (figure 3). Middle managers may experience increased commitment to innovation implementation because IP&Ps increase their job involvement. For example, a middle manager who receives incentives for implementing an innovation may find that he or she is more interested in innovation implementation than a middle manager who does not receive incentives for implementing the innovation. Indeed, Eisenberger and colleagues (1999) found that financial incentives for meeting a performance standard were associated with greater perceived competence; in turn, perceived competence was associated with greater task interest.

Increased commitment to innovation implementation might also be related to job affect. Middle managers who have access to training resources may feel more competent, enhancing positive mood. Indeed, in a study of perceived organizational support among postal workers, Eisenberger and colleagues (2001) found that positive mood mediated the relationship between perceived organizational support and commitment to the organization.

Middle managers may also experience increased commitment to innovation implementation because IP&Ps decrease strain associated with innovation implementation. Having access to human resources, for example, may give middle managers the ability to commit to innovation implementation by ameliorating some of the strain associated with their work, giving them the opportunity to engage in activities that demonstrate commitment to innovation implementation. Indeed, Cropanzano and colleagues (1997) found that
perceived organizational support predicted strains such as fatigue and burnout. Implementing quality improvement initiatives is extremely demanding of employees and organizations—cognitively, emotionally, physically, and spiritually (Shortell et al., 1998). Middle managers who have access to supportive IP&Ps may experience a decrease in these strains, thereby increasing commitment to innovation implementation.
CHAPTER 4
STUDY DESIGN AND DATA

4.1 Overview and rationale

The goal of this study was to understand the role of middle managers in innovation implementation in health care organizations. The aims of this study were:

Aim 1: To assess the relationship between (1) middle managers’ commitment to innovation implementation and implementation effectiveness and (2) implementation policies and practices (IP&Ps) and middle managers’ commitment to innovation implementation in health care organizations.

Aim 2: To enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations.

The study used a mixed method sequential design to triangulate results and minimize mono-method bias (Cook & Campbell, 1979; Tashakkori & Teddlie, 1998), and to elaborate on survey findings using illustrations from interviews with middle managers (Greene, Caracelli, & Graham, 1989). Aim 1 analyses employed secondary data to assess the
relationship between (1) IP&Ps and middle managers’ commitment to innovation implementation and (2) middle managers’ commitment and implementation effectiveness. Aim 2 analyses employed semi-structured interviews with 16 of the middle managers included in Aim 1 to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. The interviews were also designed to verify and help interpret results in Aim 1 analyses. I mixed data types because neither quantitative nor qualitative data alone are sufficient to capture the complexities of innovation implementation. When combined, quantitative and qualitative data offer a more nuanced understanding of innovation implementation (Tashakkori & Teddlie, 1998). Figure 4.1 visually depicts the mixed methods sequential design procedures.
Figure 4.1. Mixed methods sequential design procedures

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<th>Procedure</th>
<th>Product</th>
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<td>Quantitative data</td>
<td>Cross-sectional survey of 120 middle managers</td>
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<td>Data screening (univariate, multivariate)</td>
<td>Descriptive statistics, missing data</td>
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<td>Factor analysis</td>
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<td>Selecting 4 participants from each quadrant (16 total; see section 4.3.b.)</td>
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<td>Individual semi-structured telephone interviews with 16 participants</td>
<td>Interview participants (N=16)</td>
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<td>Coding and thematic analysis</td>
<td>Text data (interview transcripts, documents,</td>
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<td>Within- and across-case analysis</td>
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<td>Interpretation and explanation of the quantitative and qualitative results</td>
<td>Similar and different themes</td>
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<td>Discussion</td>
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4.2 Study context

The study capitalized on an ongoing evaluation of the Health Disparities Collaborative (HDC), a six-year initiative that began in 1999 and was specifically designed to reduce health disparities in federally qualified health centers (FQHCs) (Chin et al., 2004; Landon et al., 2007). FQHCs have a significant role in addressing health disparities: FQHCs serve patients who are vulnerable to suboptimal care—those with limited access to care, including low-income patients, the uninsured, patients with limited English proficiency, migrant and seasonal farm workers, and patients who are homeless or live in public housing (Bureau of Primary Health Care, 2009). Also, relative to other health care organizations, FQHCs serve a disproportionate number of racial and ethnic minorities. In 2008, FQHCs served more than twice the proportion of African Americans and Latinos in the US population. Despite their significant role in caring for patients who are vulnerable to disparities in care, FQHCs’ resources are often limited. FQHCs are charged with providing care to all, with fees based on ability to pay. FQHCs primarily rely on a combination of grant funding and private donations (Bureau of Primary Health Care, 2009). With an annual budget of $1.5 million, the FQHC program faces the challenge of improving the quality of the care that they provide despite a continuously growing number of underserved people (Chien, Walters, & Chin, 2007). Substantial turnover of management, administrative, and clinical employees compound the challenge to improve the quality of care in FQHCs; advances in patient care approaches are limited by the constant need to retrain employees (Chin et al., 2004).

The Bureau of Primary Health Care developed the HDC to improve the quality of care in FQHCs in an effort to eliminate health disparities and narrow the gap between evidence and practice (Texas Association of Community Health Centers, 2009). The goals of the HDC
were to decrease or delay disease complications, decrease the economic burden for patients and FQHCs, and improve access to quality chronic disease care for underserved populations by developing infrastructure, leadership, and expertise through continuous learning, change, and improvement.

In 1998, the Bureau of Primary Health Care invited FQHCs to participate in the HDC. Initially, 88 FQHCs in the Midwest and West Central United States volunteered to participate in a pilot HDC that focused on improving diabetes care. A variety of health center employees, from CEOs to middle managers to physicians to nurses, initiated participation in the HDC. In this sense, the HDC was neither consistently a top-down nor bottom-up innovation. Subsequent renditions of the HDC have focused on asthma, depression, cardiovascular disease, cancer screening, and clinical systems redesign. Innovation is “an idea, practice, or object that is perceived as new by an individual or another unit of adoption” (Rogers, 2003). Consistent with this definition, the HDC was an innovation because the practice was new to employees who participated in the HDC. Although some employees may have engaged in quality improvement (QI) initiatives before the HDC, the HDC was a distinct, major initiative that employed strategies that were unfamiliar to FQHC employees (Chin et al., 2004).

The sampling frame for this study was restricted to FQHCs in the Midwest and West Central United States that had participated in the HDC for at least one year by March 2004. One hundred seventy-three FQHCs met these criteria. Surveys were sent to 149 of these FQHCs that identified a Chief Executive Officer [CEO], Medical Director [MD], and middle manager. The 120 of these FQHCs with a middle manager who completed the survey were
included in Aim 1 analyses (81 percent response rate); 16 of these middle managers were selected for inclusion in Aim 2 analyses based on criteria discussed in detail in section 4.3.2.

4.2.1. Health Disparities Collaborative initiative: An innovation in health care

Beginning in 1999, participating health centers were expected to form QI teams that regularly met with health centers’ top managers; create a registry of patients with chronic diseases to help track clinical care; attend one national and three regional learning sessions where teams learned about the Chronic Care Model (Wagner et al., 1996) and Plan-Do-Study-Act cycles using the Breakthrough Series process (Wagner et al., 2001); and engage in activities to commit to the implementation of the HDC including the HDC listserv, web page, virtual classroom, conference calls, and feedback on monthly HDC progress reports from regional coordinators and employees. Figure 4.2 contains a timeline of HDC activities.
Figure 4.2. Health Disparities Collaborative timeline

1998 1999 2000 2001 2002 2003 2004

- Quality improvement teams formed
- Breakthrough Series national meeting teaches Plan, Do, Study, Act; Chronic Care Model
- Registries created
- Regular meetings with top managers began
- Listserv, web page, and virtual classroom became available
- Monthly conference calls began
- Monthly HDC progress reports and feedback began
- Annual regional meetings began
- Survey administered

Bureau of Primary Health Care
invited federally funded health centers
to participate in the HDC
The HDC is an ideal innovation to study for the purpose of this study because QI initiatives are particularly vulnerable to poor implementation; they are often given low priority and require substantial financial, human, and training resources (Blumenthal & Kilo, 1998; Westphal, Gulati, & Shortell, 1997). Wide variation has been found in QI initiative implementation (Pearson et al., 2005).

4.2.2. Sample

For both Aim 1 and 2 analyses, the study sample consisted of Team Leaders in health centers located in the Midwest and West Central regions of the United States who participated in the HDC for at least one year. One hundred seventy-three FQHCs met these criteria. The surveys used for Aim 1 were sent to the 149 of these FQHCs that identified a CEO, MD, and middle manager; the 120 middle managers who responded to the survey were included in Aim 1 analyses (81 percent response rate); 16 of these middle managers were selected for inclusion in Aim 2 analyses based on criteria discussed in detail in section 4.3.2 below.

Team Leaders were middle managers in the sense that they both supervised team members in their effort to implement the HDC (i.e., facilitated team meetings, resolved conflict among HDC team members, and guided and directed HDC team members) and were supervised by health centers’ top managers. The amount of authority that Team Leaders had depended on the support they received from top managers. Team Leaders were selected to fill the role through a mutual process of volunteering and appointment by CEOs based on leadership skills and personality. Aim 1 analyses employed data from a self-administered survey independently completed in 2004 by Team Leaders and CEOs. For Aim 2, I
conducted semi-structured interviews with a subset of these Team Leaders (hereafter “middle managers”).

4.3 Data sources

4.3.1. Aim 1

The primary data source for Aim 1 came from a cross-sectional survey of 120 middle managers in 120 health centers (one middle manager per health center) representing 10 Midwestern and West Central states who participated in the HDC. The survey represents an ideal data source for the study, and the data are unique because they pertain to an innovation that was simultaneously implemented in multiple health care organizations. Studying multiple organizations improves the generality of results; studying a single innovation permits the use of a single and consistent measure of implementation effectiveness. Further, the survey fulfills Weiner, Amick, and Lee’s (2008) criteria for measuring organizational readiness for change: The survey specifically focused on respondents’ attention to HDC implementation, aggregated individual middle managers’ appraisals of their health centers’ capabilities as a whole, and surveyed multiple organizations. Secondary data of this kind are scarce given the novelty of the research topic.

The survey was conducted between March and December 2004 by the National Opinion Research Center, the University of Chicago, and the MidWest Clinicians Network using the standards of Dillman’s Total Design Method (1978). Dillman’s Total Design Method involved identifying each aspect of the survey process that might affect the quality or quantity of responses and modifying the process accordingly. Specifically, the cost of completing the survey (i.e., respondents’ time, effort, emotional toll) was minimized to the
extent possible through careful survey design, and the benefits of responding to the survey were emphasized (i.e., by completing the survey, middle managers would contribute to research that has the potential to improve future HDC efforts). Telephone prompting, up to two additional survey mailings via express delivery, and letters of support from Bureau of Primary Health Care officials were used to increase response.

The HDC began in 1999, and the survey was conducted in 2004. As such, the survey allowed sufficient time for middle managers to decide how committed they were to HDC implementation and to act on this decision. The surveys were sent to 149 eligible middle managers. The final overall response rate was 81 percent (N = 120). The study period was calendar year 2003 through 2004 because survey questions specifically requested responses regarding this period. Surveys were also sent to CEOs (n = 103). I used CEOs’ responses to survey questions regarding organizational size and location in lieu of middle managers’ responses because CEOs were most likely to have accurate information regarding these measures. I accounted for common method variance associated with using middle managers’ responses alone to construct all other variables. This method is described in detail in section 4.5.1 below.

4.3.2. Aim 2

Semi-structured interviews were conducted with 16 of the middle managers included in Aim 1. The interviews shed light on concepts that cannot be captured in surveys and allowed me to explore the underlying reasons for relationships identified in Aim 1 analyses. To ensure variation in the key constructs, I selected middle managers based on their level of commitment to HDC implementation and the effectiveness of HDC implementation in their
health centers using the following method: (1) I used a publicly available list of 149 health centers that participated in the HDC to call middle managers. I attempted to contact middle managers who no longer worked in the health centers using forwarding information provided by the health center. (2) I requested middle managers’ consent to identify their Aim 1 survey responses to determine whether they could be classified into one of the following quadrants:

**Figure 4.3. Criteria for inclusion in qualitative study**

<table>
<thead>
<tr>
<th>Implementation effectiveness</th>
<th>Commitment to HDC implementation</th>
<th>High (≥3.33)</th>
<th>Low (≤2.33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (≥6.86)</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Low (≤5)</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

I was unable to reach 89 of the middle managers, three declined to participate in the qualitative study, and fifty-seven middle managers consented to participate in the qualitative study. Of the 57 middle managers who consented, the sixteen with the most extreme implementation effectiveness and commitment to HDC implementation scores were selected for participation in the qualitative study: Thresholds for “high” and “low” commitment to HDC implementation and implementation effectiveness were determined based on the distribution of responses from the 57 middle managers who consented. Implementation effectiveness was classified as “high” for middle managers who scored in the top twenty-fifth percentile and “low” for those who scored in the bottom twenty-fifth percentile. For example, the maximum score for implementation effectiveness was 11, and the maximum score for commitment to HDC implementation was 5; middle managers in the high implementation effectiveness/high commitment to HDC implementation quadrant scored a minimum of 6.86 for implementation effectiveness and 3.33 for commitment to HDC implementation (see figure 4.3). Two of the middle managers selected for participation in the qualitative study no
longer worked in the health centers in which they completed Aim 1 surveys, but I reminded them to respond to interview questions based on their experience in the health center in which they implemented the HDC. Indeed, I reminded all of the middle managers whom I interviewed to respond to interview questions based on their experience in the HDC in the study period (calendar year 2003 through 2004) to the extent possible.

Interviewing multiple middle managers allowed me to identify patterns that are robust against idiosyncratic features of any given middle manager’s experience, thereby addressing selection and selection-treatment interaction biases (Cook & Campbell, 1979). Middle managers who could not be classified into one of the above quadrants were excluded from participation in the qualitative study. The consent (Appendix 1) and interview guide (Appendix 2) were approved by the Institutional Review Board at the University of North Carolina at Chapel Hill.

One- to two-hour interviews were conducted via telephone and were scheduled based on the participant’s convenience. I conducted interviews in a private office with a closed door at the University of North Carolina at Chapel Hill. Interviews were recorded and transcribed to enhance data reliability. My interviewing training and experience minimized middle managers’ evaluation apprehension and my own expectancies as an interviewer (Cook & Campbell, 1979).

I followed an interview guide (Appendix 2) based on the theoretical framework (figure 3). Using the interview guide helped to avoid instrumentation bias (Cook & Campbell, 1979). Basing the interview guide on the theoretical model reduced the bias associated with inadequate preoperational explication of constructs that may threaten the validity of study findings (Cook & Campbell, 1979). Including several questions in the interview guide
targeting the same construct addressed the threat of mono-operational bias (Cook & Campbell, 1979). Prior to conducting interviews with the sixteen middle managers selected for inclusion in the qualitative study, I conducted pilot interviews with two middle managers in health care organizations that are unaffiliated with the HDC. My observations and feedback from pilot interview subjects were used to refine the interview guide. Pilot interview data were not included in final analyses. During HDC middle manager interviews, questions were amended and supplemented based on middle managers’ responses.

4.4 Measurement

4.4.1. Aim 1

Overview

Analyses that were used to develop the single multivariate ordinary least squares (OLS) regression model for the relationship between IP&Ps and middle managers’ commitment to HDC implementation included all IP&Ps hypothesized to influence middle managers’ commitment to HDC implementation (incentives; performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support) because health centers with the infrastructure necessary to offer one implementation policy or practice may have been likely to offer other IP&Ps as well. Analyses for the model also included the size of middle managers’ health centers; health centers that serve a large number of patients may have been likely to require the kind of infrastructure necessary to offer IP&Ps (Solberg et al., 2000).

Analyses that were used to develop the multivariate OLS regression model for the relationship between middle managers’ commitment to HDC implementation and
implementation effectiveness included health center factors and middle manager factors that may have influenced the effectiveness of implementation of the HDC in the middle manager’s health center. The model also included IP&Ps because health centers with the infrastructure necessary to offer IP&Ps also may have been likely to have the infrastructure necessary to effectively implement HDC components (Solberg et al., 2000).

Dependent and independent variables of interest were operationalized as the averages of Likert scale responses to several survey items (see table 4.4). To ensure face validity, the variables were developed in collaboration with experts in job design, health care organization delivery and change, care and outcomes improvement among vulnerable patients with chronic disease, and two middle managers who participated in the HDC and completed the survey.

Factor analyses and Cronbach’s alpha were used to assess the psychometric attributes of each variable. Table 5.3 displays means, standard deviations, and correlations. Some variables were correlated, but no variables in the data were critically collinear \( r < .6 \). Further, variance inflation factors (VIF) were all less than 2.2 (10 is the VIF above which multicollinearity is considered a problem (Kennedy, 1998)). I added key independent variables one at a time to ensure stability in coefficients and standard errors. The results of these measures suggested that multicollinearity was not a problem in the final models.

**Variable descriptions**

*Middle managers’ commitment to innovation implementation* is a behavioral manifestation of middle managers’ effort and engagement in activities that enable innovation implementation. Middle managers’ commitment to innovation implementation was operationalized as a middle manager’s average response to survey items that assessed how
regularly they used an HDC listserv, virtual classroom, and web page; these represent a
behavioral manifestation of middle managers’ effort and engagement in implementing the
HDC (see table 4.4) (Wagner et al., 2001). Indeed, as I describe in detail in section 6.4
below, Aim 2 results indicate that the regular use of an HDC listserv, virtual classroom, and
web page accurately represented their commitment to HDC implementation, as I
operationalized it in Aim 1; several middle managers explained that using these online HDC
tools represented their effort to enable health center employees to implement the HDC as
effectively as possible.

_HDC implementation effectiveness_ was operationalized as middle managers’ average
responses to survey items that assessed how effectively the health center used the six
interrelated components of the chronic care model (self management support, clinical
information systems, delivery system redesign, decision support, health care organization,
and community resources; see table 4.4). Chronic disease management improvement was the
goal of the HDC; the HDC is an innovation in health care that may be viewed as effective
when it improves chronic disease management. Health centers that effectively use the six
components of the chronic care model addressed in the survey items that I used to
operationalize implementation effectiveness variables have the potential to improve chronic
disease management; the extent to which these six components are standard practice in health
centers represents the effectiveness of the implementation of the six components of the
chronic care model. (Bodenheimer et al., 2002a, 2002b). For example, a private practice
featured in case study of health care organizations attempting to improve chronic illness care
partnered with an insurer to reimburse office-based diabetes education (community linkages).
A community health center featured in another case study reported providing patients with
self-management plans (self-management) and relieving physicians’ workload by having medical assistants read patients’ flow sheets and make appropriate preparations for needed examinations or tests (delivery system design) (Bodenheimer et al., 2002a). Factor analyses revealed a three-item solution for implementation effectiveness: (1) community linkages, (2) self-management support, and (3) delivery system design—components of the chronic care model (Bodenheimer et al., 2002a). The biases associated with constructing both middle managers’ commitment and implementation effectiveness variables of middle managers’ responses to survey items alone are described in detail in section 7.3.2.

The performance reviews variable was operationalized as middle managers’ responses to a survey item that assessed the degree to which the respondent agreed that employee performance reviews addressed HDC performance.

Local social network involvement was operationalized as middle managers’ discrete responses to a survey question regarding the total number of sites in the middle manager’s health center that were eligible to participate in the HDC.

All other IP&P variables were operationalized as middle managers’ average responses to several Likert scale survey items: The incentives variable was operationalized as middle managers’ average responses to items that assessed whether a middle manager was involved in the HDC because of the career promotion or professional development activities that it offered. Access to financial resources was operationalized as middle managers’ average responses to items that assessed how much Bureau of Primary Health Care Funding was used for training in quality improvement techniques, information system technical support, data entry activities, and employees’ time spent on quality improvement. Factor analyses revealed a two-item solution for access to human resources: (1) clinical
and (2) administrative. Access to administrative human resources was operationalized as middle managers’ average responses to items that assessed the level of involvement of front desk, medical records, and data entry employees in the HDC. Access to clinical human resources was operationalized as middle managers’ average responses to items that assessed the level of involvement of primary care providers, specialty providers, and nursing employees in the HDC. Factor analyses revealed a two-item solution for access to training resources: training in (1) changing health center systems and (2) encouraging providers to correctly use HDC tools. Access to health center systems training was operationalized as middle managers’ average responses to items that assessed the extent to which they felt that s/he needed additional support or resources to help patients self-manage their illness, improve information systems, and implement PDSA cycles. Access to provider training resources was operationalized as middle managers’ average responses to items that assessed the extent to which they felt that s/he needed additional support or resources to help to encourage providers to follow practice guidelines and make use of flow sheets. Factor analyses revealed a two-item solution for top managers’ support: (1) an environment and (2) technology that encourages innovation implementation. Top managers’ support for an environment that encourages innovation implementation was operationalized as middle managers’ average responses to items that assessed how much assistance in getting buy-in from providers and creating an environment where HDC was given high priority the HDC received from their health centers’ leadership. Top managers’ support in the form of technology was operationlized as middle managers’ average responses to items that assessed how much training in quality improvement techniques and
information system technical support the HDC received from their health centers’ leadership.

*Years of HDC experience* was operationalized as middle managers responses to a survey question regarding the number of years a middle manager’s health center had been participating in the HDC as of 2004. The variable was included as a control because implementation effectiveness may have improved over time as quality improvement teams become familiar with the HDC.

*Health center size* was operationalized as CEOs’ discrete responses to a survey question regarding the number of unique, unduplicated patients seen in a middle manager’s health center in one year. The size of middle managers’ health centers influences implementation effectiveness (Solberg et al., 2000); integrating HDC components may have been more complicated in health centers that serve more patients. For example, linking patients to outside resources may have been more difficult in health centers that serve a large number of patients. Health center size may have also influenced middle managers’ commitment to HDC implementation. With a greater number of patients, middle managers may have had to attend to a greater number of task demands that detract from their ability to commit to HDC implementation.

*Turnover in the health center* was operationalized as middle managers’ average responses to a survey question regarding the number of Team Leaders (the middle manager of interest for this study) that had been at the health center since the beginning of the HDC as of 2004. Turnover in middle managers’ health centers may have decreased implementation effectiveness (Solberg et al., 2000); the loss of HDC-related expertise in middle managers’ health centers may have limited their ability to integrate HDC components into health center
practices. Turnover also may have decreased middle managers’ commitment to HDC implementation; associated personnel demands may have limited middle managers’ ability to commit to HDC implementation.

_The location of middle managers’ health centers_ was operationalized as CEOs’ dichotomous responses to a survey question regarding whether a middle manager’s health center was located in a rural or urban location. The location of middle managers’ health centers may have influenced implementation effectiveness. Partnerships with community organizations may have been more difficult to establish in rural locations due to low population density. Indeed, aspects of the external environment are thought to influence implementation effectiveness (Solberg et al., 2000). Location also may have influenced middle managers’ commitment to HDC implementation; regular use of the HDC web page, listserv, and virtual classroom may have been more critical for middle managers in isolated, rural locations.

_Middle managers’ organizational tenure_ was operationalized as middle managers’ discrete responses to a survey question regarding the number of years they had been at the health center as of 2004. Middle managers’ organizational tenure may have influenced implementation effectiveness (Solberg et al., 2000); longer organizational tenure may have offered middle managers the organizational knowledge that is necessary to integrate HDC components into health center practices. For example, middle managers with longer organizational tenure may have been more likely to know whom to contact for information systems help. Middle managers’ organizational tenure also may have influenced their commitment to HDC implementation; less organizational tenure may have required middle managers to engage in activities that increase their organizational knowledge such as
procedures for requesting information systems help, detracting from their ability to commit to HDC implementation.

*Middle managers’ job tenure* was operationalized as middle managers’ discrete response to a survey question regarding the number of years they had been in the role of Team Leader at the health center as of 2004. Middle managers’ job tenure may have influenced implementation effectiveness (Solberg et al., 2000); longer job tenure may have offered middle managers knowledge of how to effectively perform in their role, which may have enabled them to integrate HDC components into health center practices. For example, middle managers with longer job tenure may have been more adept than middle managers with shorter job tenure at effectively using the HDC listserv. Middle managers’ job tenure also may have influenced their commitment to HDC implementation; less job tenure may have required middle managers to engage in activities that increase their knowledge of effective role performance, detracting from their ability to commit to HDC implementation.

*Middle managers’ occupation* was operationalized as middle managers’ categorical responses to a survey question regarding whether or not their primary position at the health center was (1) provider (nurse practitioner, dentist, physician, physician assistant, family nurse practitioner, registered nurse clinician), (2) other clinical employees (certified medical assistant, diabetes educator, certified nurse specialist, health educator, social worker, licensed practical nurse, dietician, registered nurse), or (3) administrator (administrator, medical records employees, other). Middle managers’ occupation (provider, other clinical employee, administrative employee) may have influenced implementation effectiveness (Solberg et al., 2000); middle managers who were patient care providers may have been more adept at facilitating the integration of clinical HDC components into health center practices. Middle
managers’ occupation also may have influenced their commitment to HDC implementation; middle managers with an administrative background may have had more frequent access to computers at which they could engage in behaviors exhibiting commitment to HDC implementation.
<table>
<thead>
<tr>
<th>Variable/subscale</th>
<th>Survey items</th>
<th>Response format</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation effectiveness</td>
<td>For each row, please cross the box that best describes the level for your chronic illness care that currently exists at your health center.</td>
<td>11-point scale¹</td>
<td>0.7789</td>
</tr>
<tr>
<td></td>
<td>Linking patients to outside resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partnerships with community organizations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community linkages</td>
<td></td>
<td>11-point scale²</td>
<td></td>
</tr>
<tr>
<td>Self-management</td>
<td>For each row, please cross the box that best describes the level for your chronic illness care that currently exists at your health center.</td>
<td>11-point scale³</td>
<td>0.7377</td>
</tr>
<tr>
<td></td>
<td>Assessment and documentation of self-management needs and activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self-management support</td>
<td>11-point scale⁴</td>
<td></td>
</tr>
<tr>
<td>Delivery system design</td>
<td>For each row, please cross the box that best describes the level for your chronic illness care that currently exists at your health center.</td>
<td>11-point scale⁵</td>
<td>0.7712</td>
</tr>
<tr>
<td></td>
<td>Involvement of specialists in improving primary care</td>
<td>11-point scale⁶</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appointment system</td>
<td>11-point scale⁷</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle managers’ commitment to innovation implementation</td>
<td>I use the Collaborative web page regularly.</td>
<td>5-point scale⁸</td>
<td>0.7499</td>
</tr>
<tr>
<td></td>
<td>I use the Collaborative listserv regularly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I use the Collaborative virtual classroom regularly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IP&amp;Ps</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incentives</td>
<td>I am involved in the Collaborative because of the…career promotion opportunities it offers.</td>
<td>5-point scale⁹</td>
<td>0.6115</td>
</tr>
<tr>
<td></td>
<td>…professional development activities it offers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance reviews</td>
<td>Employee performance reviews address Collaborative performance</td>
<td>5-point scale¹⁰</td>
<td>n/a</td>
</tr>
<tr>
<td>Access to financial resources</td>
<td>During Fiscal Year 2003, please indicate how much Bureau</td>
<td>5-point scale¹¹</td>
<td>0.8784</td>
</tr>
<tr>
<td>Variable/subscale</td>
<td>Survey items</td>
<td>Response format</td>
<td>Cronbach’s alpha</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------</td>
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</tr>
<tr>
<td></td>
<td>of Primary Health Care funding was used at your center for Collaborative related…</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…training in quality improvement techniques.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…information system technical support.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…data entry activities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…staff time spent on quality improvement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Access to human resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>For each of the following individuals or groups, please indicate their level of involvement in the Collaborative at your health center:</td>
<td>5-point scale</td>
<td>0.7502</td>
</tr>
<tr>
<td></td>
<td>Front Desk staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medical Records staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Entry staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical</td>
<td>For each of the following individuals or groups, please indicate their level of involvement in the Collaborative at your health center:</td>
<td>5-point scale</td>
<td>0.7295</td>
</tr>
<tr>
<td></td>
<td>Primary care providers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specialty providers (e.g., dental providers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Access to training resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changing health systems</td>
<td>I feel I need additional support or resources (e.g., training, tools, examples) to…</td>
<td>5-point scale</td>
<td>0.6521</td>
</tr>
<tr>
<td></td>
<td>…help patients self-manage their illness.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…improve our information systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…implement plan-do-study-act cycles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel I need additional support or resources (e.g., training, tools, examples) to…</td>
<td>5-point scale</td>
<td>0.7942</td>
</tr>
<tr>
<td></td>
<td>…encourage providers to follow practice guidelines.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…encourage providers to make use of flow sheets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouraging providers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local social network involvement</td>
<td>How many total sites does your health center currently have that are eligible to participate in the Collaborative?</td>
<td>Discrete</td>
<td>n/a</td>
</tr>
<tr>
<td>Top managers’ support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable/subscale</td>
<td>Survey items</td>
<td>Response format</td>
<td>Cronbach’s alpha</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>For an environment that encourages innovation implementation</td>
<td>During Fiscal Year 2003, please indicate how much support (financial or otherwise) the Collaborative received from your health center's leadership: Assistance in getting &quot;buy-in&quot; from providers Environment where Collaborative is given high priority During Fiscal Year 2003, please indicate how much support (financial or otherwise) the Collaborative received from your health center's leadership: Training in quality improvement techniques Information system technical support</td>
<td>5-point scale&lt;sup&gt;10&lt;/sup&gt;</td>
<td>0.6983</td>
</tr>
<tr>
<td>In the form of technology</td>
<td></td>
<td>5-point scale&lt;sup&gt;10&lt;/sup&gt;</td>
<td>0.8766</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year in which health center began HDC</td>
<td>Year in which health center began HDC</td>
<td>Discrete&lt;sup&gt;14&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td>Organizational size</td>
<td>Approximately how many unique, unduplicated patients are seen at your center each year?</td>
<td>Discrete</td>
<td>n/a</td>
</tr>
<tr>
<td>Organizational turnover</td>
<td>For your health center's initial Collaborative, how many team leaders have there been?</td>
<td>Discrete</td>
<td>n/a</td>
</tr>
<tr>
<td>Organizational location</td>
<td>Is your health center in a rural or urban location?</td>
<td>Yes/no&lt;sup&gt;15&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td>Organizational tenure</td>
<td>How long have you been at this community health center?</td>
<td>Discrete&lt;sup&gt;16&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td>Job tenure</td>
<td>How long have you been Team Leader?</td>
<td>Discrete&lt;sup&gt;16&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td>Middle manager occupation</td>
<td>What is your current position at the health center? (Provider [nurse practitioner, dentist, physician, physician assistant, family nurse practitioner, registered nurse clinician], other clinical staff [certified medical assistant, diabetes educator, certified nurse specialist, health educator, social worker, licensed practical nurse, dietician, registered nurse], or administrator [administrator, medical records staff, other])</td>
<td>Yes/no&lt;sup&gt;17&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Marker variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Board of directors’ involvement</td>
<td>For each of the following individuals or groups, please indicate their level of involvement in the Collaborative at your health center: Board of directors</td>
<td>5-point scale&lt;sup&gt;11&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
<tr>
<td>Learning session HDC team motivation</td>
<td>Phase 2 learning sessions help to motivate our Collaborative team</td>
<td>5-point scale&lt;sup&gt;7&lt;/sup&gt;</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Range encompasses: Is not done systematically (scored 0-2); limited to a list of identified community resources in an accessible format (scored 3-5); accomplished through a designated staff person or resource responsible for ensuring providers and patients make maximum use of community resources (scored 6-8); accomplished through active coordination between the health system, community service agencies and patients (scored 9-11)

Range encompasses: Do not exist (scored 0-2); are being considered but have not yet been implemented (scored 3-5); are formed to develop supportive programs and policies (scored 6-8); are actively sought to develop formal supportive programs and policies across the entire system (scored 9-11)

Range encompasses: Are not done (scored 0-2); are expected (scored 3-5); are completed in a standardized manner (scored 6-8); are regularly assessed and recorded in standardized form linked to a treatment plan available to practice and patients (scored 9-11)

Range encompasses: Is limited to the distribution of information (pamphlets, booklets) (scored 0-2); is available by referral to self-management classes or educators (scored 3-5); is provided by trained clinical educators who are designated to do self-management support, affiliated with each practice, and see patients on referral (scored 6-8); is provided by clinical educators affiliated with each practice, trained in patient empowerment and problem-solving methodologies, and see most patients with chronic illness (scored 9-11).

Range encompasses: Are not available (scored 0-2); are available but are not integrated into care delivery (scored 3-5); are available and supported by provider education (scored 6-8); are available, supported by provider education and integrated into care through reminders and other proven provider behavior change methods (scored 9-11)

Range encompasses: Is primarily through traditional referral (scored 0-2); is achieved through specialist leadership to enhance the capacity of the overall system to routinely implement guidelines (scored 3-5); includes specialist leadership and designated specialists who provide primary care team training (scored 6-8); includes specialist leadership and specialist involvement in improving the care of primary care patients (scored 9-11)

Range encompasses: Can be used to schedule acute care visits, follow-up and preventive visits (scored 0-2); ...assures scheduled follow-up with chronically ill patients (scored 3-5); is flexible and can accommodate innovations such as customized visit length or group visits (scored 6-8); includes organization of care that facilitates the patient seeing multiple providers in a single visit (scored 9-11)

Range encompasses: Is scheduled by patients or providers in an ad hoc fashion (scored 0-2); is scheduled by the practice in accordance with guidelines (scored 3-5); comprehensive care is assured by the practice team by monitoring patient utilization (scored 6-8); is customized to patient needs, varies in intensity and methodology and assures guideline follow-up (scored 9-11)

Strongly disagree; disagree; neither agree nor disagree; agree; or strongly agree

None; a little; a moderate amount; quite a bit; or a great deal

Ignores or refuses to be involved in the collaborative; grudgingly participates; promotes activities verbally; supports activities with words and actions; actively involved and/or gets people excited about participating in the collaborative; or no staff

Operationalized as a proportion of values for survey items

Greatly worsened; somewhat worsened; no change; somewhat improved; greatly improved

Data obtained from Midwest Clinicians’ Network and West Central Cluster

Operationalized as a dichotomous indicator

In years
4.4.2. Aim 2

Aim 2 was to enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. To accomplish this aim, I measured middle managers’ commitment, IP&Ps, moderators, and mediators using semi-structured interviews. *Semi-structured* indicates that, although an interview guide was used and all variables were measured with each middle manager, the point at which questions regarding variables arose and the exact wording of questions was not always consistent. For example, I asked each middle manager questions relating to whether they perceived top managers to be agents of the organization; however, this question often arose when discussing top managers’ support, not after discussing each IP&P as noted in the interview guide. Appendix 2 contains examples of the wording used to measure each variable. The method of measurement for each of the variables is as follows:

*Middle managers’ commitment to innovation implementation.* To measure this construct, I asked the middle managers whom I interviewed about the primary activities that they engaged in related to implementing the HDC, how often they engaged in those activities, and whether the frequency with which they engaged in the activities changed over the course of HDC implementation.

*IP&Ps.* To assess whether middle managers received *incentives* for their commitment to HDC implementation, I asked them whether their health centers offered them any HDC-related incentives to assess. If middle managers received incentives, I then asked them what they had to do to receive the incentives. To assess whether *performance reviews* addressed middle managers’ HDC-related performance, I first asked middle managers whether they
underwent performance reviews when they were implementing the HDC. If they underwent performance reviews, I then asked whether the performance reviews evaluated their HDC-related performance. If performance reviews evaluated their HDC-related performance, I then asked what kind of feedback they received during HDC-related performance reviews.

To assess whether middle managers had access to financial resources, I asked them whether their health centers received funding for HDC implementation. To assess whether middle managers had access to human resources, I asked them whether there were particular staff whose help was important in implementing the HDC and, if so, how their help was important. To assess whether middle managers had access to training resources, I asked them whether and what kind of HDC-related training was available to them. To assess local social network involvement, I asked middle managers whether other facilities in their health centers participated in the HDC in 2004. To assess top managers’ support, I asked middle managers whether and how top managers supported HDC implementation. To assess relationships between IP&Ps and middle managers’ commitment, I asked the middle managers whom I interviewed whether or not each IP&P influenced their engagement in HDC-related activities.

Moderators. I measured two moderators: (1) whether IP&Ps are under top managers’ control and (2) whether middle managers perceive top managers to be agents of the organization. To assess whether middle managers viewed IP&Ps as being under top managers’ control, I asked them (1) whether or not they believed that top managers were obligated to offer access to IP&Ps and (2) whether or not that belief increased or decreased the influence of those IP&Ps on their commitment to HDC implementation. For example, I asked middle managers whether or not they got the sense that top managers were obligated to
conduct performance reviews. If middle managers (1) got the sense that top managers were obligated to conduct performance reviews and (2) indicated that performance reviews influenced their commitment to HDC implementation, I then asked middle managers whether that sense increased or decreased the influence of performance reviews on their commitment to HDC implementation. Indeed, as I describe in section 6.6.1 below, middle managers reported that performance reviews had a stronger effect on their commitment to HDC implementation when top managers were not obligated to conduct performance reviews. To assess whether middle managers perceived top managers to be agents of the organization, I asked them (1) whether or not they believed that top managers acted on behalf of their health center or of their own free will when offering access to IP&Ps and (2) whether or not that belief increased or decreased the influence of those IP&Ps on their commitment to HDC implementation. For example, if a middle manager were to indicate that (1) they believed that top managers acted on behalf of their health center when offering incentives and (2) incentives influenced their commitment to HDC implementation, I asked middle managers whether the fact that the top managers acted on behalf of their health center (as opposed to of their own free will) when offering incentives increased or decreased their commitment to HDC implementation.

**Mediators.** I measured three mediators: (1) job involvement, (2) job-related affect, and (3) strains. To assess *job involvement*, I asked middle managers whether and how IP&Ps influenced their identification with and interest in HDC implementation. If a middle manager indicated that IP&Ps influenced their identification with and interest in HDC implementation, I then asked the middle manager whether and how their identification with and interest in HDC implementation influenced their engagement in HDC-related activities. To assess *job-
related affect, I asked middle managers whether and how IP&Ps influenced their job satisfaction and mood. If a middle manager indicated that IP&Ps influenced their job satisfaction and/or mood, I then asked the middle manager whether and how their job satisfaction and/or mood influenced their engagement in HDC-related activities. To assess strains, I asked middle managers whether and how IP&Ps influenced their emotional or physical strains like stress or headaches. If a middle manager indicated that IP&Ps influenced their emotional or physical strains, I then asked the middle manager whether and how their emotional or physical strains influenced their engagement in HDC-related activities.

4.5 Data analysis and power analysis

4.5.1. Aim 1

Analyses were conducted using Stata 10 (Stata Corp., College Station, TX).

Missing data management. One percent of observations were missing data for the top managers’ support scale; 22 percent for the access to financial resources scale; and 37 percent for the access to human resources scale. Little’s (1998) test indicates that data were missing at random. I imputed missing data using multiple imputation (Stata 10’s ice command), a consistent and efficient method of handling missing data (Schafer & Graham, 2002). Multiple imputation produces standard errors that reflect the uncertainty associated with imputed values. Multiple imputation involved creating 20 data sets, each with different imputed values. Missing values for each variable were imputed based on a set of predictor variables. Analysis was then conducted with each of the 20 imputed data sets. These analyses were then combined to construct a single set of results.
Consideration of common method variance. To minimize the bias associated with constructing both dependent and independent variables using middle managers’ responses to survey items, I accounted for common method variance. The common method variance model asserts that “the observed variables are contaminated by a single unmeasured factor that has an equal effect on all of them” (Lindell & Whitney, 2001). In this case, the unmeasured factor is the variance associated with responding middle managers. To account for this variance, in each ordinary least squares regression model, I included a survey item that was not theoretically related to implementation effectiveness or middle managers’ commitment. These marker variables were self-reported attitude items that had the smallest possible positive correlations with dependent variables after artifactual negative correlations were removed: (1) An item relating to middle managers’ attitudes about boards of directors’ level of involvement in the HDC was used as a marker variable for the following models: (a) community linkages implementation effectiveness; (b) self-management implementation effectiveness; and (3) middle managers’ commitment. (2) An item relating to middle managers’ attitudes about the extent to which HDC learning sessions helped to motivate HDC teams was used as a marker for delivery system design implementation effectiveness. The items were imperfect marker variables in that, theoretically, they may have been related to the dependent variables; however, I chose these items based on three criteria: (1) Of all the survey items, they were the least theoretically related to the dependent variables; (2) they had the smallest possible positive correlations with dependent variables after artifactual negative correlations were removed; and (3) they had low correlations with the other predictor variables (see table 5.3). Also guarding against common method variance was the length of
the survey: it was short enough to avoid transient mood states such as boredom and fatigue (Lindell & Whitney, 2001). For all analyses, middle managers were the unit of analysis.

**Analysis**

The study sample contained 120 observations. The small size of the sample limited the statistical power of the analysis and increased the possibility of Type I error (i.e., failure to support the hypothesis when the hypothesis is true). As an alternative, bivariate analyses were used to determine which independent variables to include in multivariate analyses ($p < .1$). I chose this approach to achieve adequate statistical power and to ensure stability in coefficients and standard errors. For bivariate and multivariate analyses, $p$-values of less than .1 were considered significant.

In each multivariate OLS regression model, power to detect statistically significant relationships was sufficient ($> .8$). Shapiro-Francia tests, skewness and kurtosis tests, and visual inspection of the distribution of multivariate OLS regression residuals indicated approximate normality. I used Stata’s “robust” option to adjust for heteroskedasticity. Correlations and variance inflation factors were examined to assess multicollinearity (see table 5.3).

**Main effects.** The hypotheses that I tested are as follows:

*Hypothesis 1: Middle managers’ commitment to innovation implementation is positively related to implementation effectiveness.*

*Hypothesis 2a: Incentives are positively related to middle managers’ commitment to innovation implementation.*
Hypothesis 3a: Performance reviews are positively related to middle managers’ commitment to innovation implementation.

Hypothesis 4: Access to financial resources is positively related to middle managers’ commitment to innovation implementation.

Hypothesis 5: Access to human resources is positively related to middle managers’ commitment to innovation implementation.

Hypothesis 6: Access to training resources is positively related to middle managers’ commitment to innovation implementation.

Hypothesis 7: Local social network involvement is positively related to middle managers’ commitment to innovation implementation.

Hypothesis 8: Top managers’ support for innovation implementation is positively related to middle managers’ commitment to innovation implementation.

The statistical significance of the partial effects of the independent variables on the dependent variables in multivariate OLS regression analyses were used to test hypotheses 1, 2a, 3a, and 4-8.

Interaction effects. The effects of incentives and performance reviews on middle managers’ commitment to innovation implementation are likely to depend on other IP&Ps, which are necessary to commit to innovation implementation. The hypotheses that I tested are as follows:

Hypothesis 2b: The relationship between incentives and middle managers’ commitment to innovation implementation depends upon performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’
support, such that the relationship will be weaker when any of these other IP&Ps are available.

Hypothesis 3b: The relationship between performance reviews and middle managers’ commitment to innovation implementation depends upon incentives; access to financial, human, and training resources; local social network involvement; and top managers’ support, such that the relationship will be weaker when any of these other IP&Ps are available.

The statistical significance of the partial effects of interactions between incentives and other IP&Ps and between performance reviews and other IP&Ps in multivariate OLS regression analyses were used to test hypotheses 2b and 3b.

4.5.2. Aim 2

All interviews were transcribed verbatim, resulting in more than 300 pages of text. I employed template analysis, which combines content analysis methods with grounded theory, to identify some themes a priori from interview questions and to allow additional themes to emerge as analysis proceeds (N. King, 1998). A multifunctional qualitative data analysis software program (Atlas.ti 5.0) was used to code interview data and to identify emergent themes associated with moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. Using software to record coding steps and document coding decisions enhanced the reliability of study findings.

The text units were coded using a coding manual with definitions, decision rules, and examples to ensure consistency of data analysis and increase internal validity. The theoretical
framework for middle managers’ role in innovation implementation (figure 3) provided a starting list of codes, which were supplemented with emergent codes as the analysis proceeds. Using the coding manual addressed potential instrumentation bias (Cook & Campbell, 1979).

I began by coding a sample of three transcripts. Based on the results, I sharpened the coding manual’s code definitions, decision rules, and examples. I then coded the remaining documents, developed additional codes, and generated new propositions. Using ATLAS.ti, reports of all text segments for each code were generated. To enhance coding validity, I sought the perspective of a colleague with expertise in qualitative methods in health services research (Leah Masselink PhD, National Research Service Award Postdoctoral Fellow at the University of North Carolina at Chapel Hill’s School of Nursing) on my interpretation and application of the codes. Dr. Masselink and I independently coded three of my interview transcripts (a 20 percent sample). We then compared our coding and reconciled disagreements until we reached consensus. In most cases, the reason for the discrepancy was obvious (e.g., misapplication of inclusion/exclusion criteria for a code, lapse of attention). We resolved remaining discrepancies by collaboratively refining code definitions.

The degree to which the construct emerges in the data (its strength), and the degree to which the construct affects strategic responses (its valence) were examined to assess relationships between IP&Ps and middle managers’ commitment and mediators and moderators of the relationships. Specifically, I conducted within- and across-unit analysis to assess construct strength and valence. First, I assessed the valence of themes within each middle manager’s interview text. For example, one middle manager discussed access to financial resources, access to human resources, and top managers’ support most frequently
and emphatically. The middle manager indicated, however, that top managers’ support was necessary for her to make use of access to financial and human resources; if top managers were unwilling to give the middle manager the authority to use financial resources to access useful implementation tools and to manage human resources in a way that would facilitate HDC implementation, the middle manager was unable to make use of financial and human resources. This within-unit analysis allowed me to assess the relative and combined effects of IP&Ps on her commitment to innovation implementation. Second, I assessed construct strength through across-unit analysis. For example, I determined that interviews provided little support for the moderators proposed in the conceptual framework (figure 3) by comparing responses across middle managers’ interviews.
CHAPTER 5
QUANTITATIVE RESULTS

5.1. Overview

Aim 1 was to assess the relationship between (1) middle managers’ commitment to innovation implementation and implementation effectiveness and (2) IP&Ps and middle managers’ commitment to innovation implementation in health care organizations using secondary survey data. This chapter describes Aim 1 results.

5.2. Descriptive

5.2.1. Dependent variables

Overall, HDC implementation effectiveness was rated as suboptimal: On average, middle managers rated community linkages and self-management support implementation as moderate, but only five middle managers indicated that community linkages were fully implemented in their health centers, and only three middle managers indicated that self-management support was fully implemented in their health centers. The majority of middle managers (74 percent) rated delivery system design implementation in their health centers as poor-to-moderate, and only three middle managers rated it as fully implemented.
Middle managers’ commitment to innovation implementation varied. On average, commitment to innovation implementation was moderate; however, less than 12 percent of middle managers “agreed” or “strongly agreed” that they regularly engaged in HDC implementation activities.

5.2.2. Independent variables

Overall, middle managers rated their access to IP&Ps as moderate-to-poor. For example, although half of middle managers in the sample reported that they received “a moderate amount,” “quite a bit” or “a great deal” of incentives related to HDC implementation, nearly a third of middle managers in the study sample indicated that they received “a little” or no incentives. And only a minority of middle managers (36 percent) “agreed” or “strongly agreed” that employee performance reviews addressed HDC performance; most middle managers either reported that they “neither agreed nor disagreed” or “disagreed” that employee performance reviews addressed their HDC-related performance. Nearly half of middle managers indicated that they received “a little” or “no” access to financial resources. Access to human resources was better than access to other IP&Ps: Only four middle managers indicated that administrative human resources “refused to participate” or “grudgingly participated,” whereas more than half of middle managers reported that administrative human resources “support[ed] activities with words and actions” or were “actively involved and/or [got] people excited about participating in the collaborative.” Similarly, only two middle managers indicated that clinical human resources “refused to participate” or “grudgingly participated,” and more than half of middle managers reported that clinical human resources “support[ed] activities with words and actions” or were
“actively involved and/or [got] people excited about participating in the collaborative.” Like access to human resources, access to training resources was better than access to most other IP&Ps: More than half of middle managers indicated that access to training in changing health center systems and encouraging providers to correctly use HDC tools was more than adequate; less than 12 percent of middle managers indicated that their access to training resources was inadequate or nonexistent. Local social network involvement was also limited: Most of middle managers’ health centers were comprised of just one facility, and middle managers’ health centers were comprised of 4 facilities on average; only 7 middle managers worked in health centers with 10 or more facilities. Top managers’ support for innovation implementation was lacking: Top managers’ support for an environment that encourages innovation implementation was moderate-to-poor in most middle managers’ health centers; just 10 percent of middle managers indicated that they received “a great deal” of support from top managers for an environment that encourages innovation implementation, and more than 40 percent received only “a little” or no support from top managers for an environment that encourages innovation implementation. On average, middle managers rated top managers’ support in the form of technology as moderate; however, almost half of middle managers reported that they received only “a little” or no support from top managers in the form of technology.

5.2.3. Control variables

Health center variables

At the time of the survey, more than three quarters of middle managers’ health centers had participated in the HDC for three or more years, and almost a quarter had participated
since the beginning of the HDC in 1998. Middle managers’ health centers served as few as 500 unduplicated patients per year and as many as 58,000; on average, they saw 14,000 unduplicated patients per year. At the time of the survey, more than half of middle managers were the only middle manager who had served as team leader at their health center. A minority (16 percent) of middle managers had been preceded by three or more team leaders in their health center. Half (52 percent) of middle managers’ health centers were in rural locations.

*Middle manager variables*

Middle managers had worked at their health center for an average of 7 years. Almost a quarter of middle managers had worked at their health center for 10 or more years. At the time of the survey, middle managers had been the team leader in their health center for an average of 2.7 years at. Most (34 percent) middle managers were clinicians (such as social workers, diabetes educators, or registered nurses); 20 percent were providers (such as physicians, nurse practitioners or physician assistants); and 28 percent were administrators (such as community education coordinators or chronic care coordinators). Three middle managers reported that they were both clinicians and providers; eight reported that they were both providers and administrators; and 27 reported that they were both clinicians and administrators.

**5.3. Bivariate**

5.3.1. Correlates of implementation effectiveness

Table 5.3 displays means, standard deviations, and correlations. The three indicators of implementation effectiveness – community linkages, self-management support, and delivery
system design – are moderately correlated with one another. Although this may indicate that the indicators could be combined into a higher-order measure of implementation effectiveness, the three indicators represent theoretically distinct constructs; as described in detail in section 5.2.1 above, high ratings of one indicator of implementation effectiveness does not necessarily translate to high ratings of other indicators of implementation effectiveness. For example, delivery system design was the least effectively implemented in middle managers’ health centers. Furthermore, bivariate analyses showed that there was no relationship between middle managers’ commitment to innovation implementation and delivery system design implementation effectiveness; however, middle managers’ commitment to innovation implementation had statistically significant, positive relationships with the effective implementation of community linkages and self-management support.

And, as described in detail in section 5.4.1 below, in regression analyses, the relationship between middle managers’ commitment and implementation effectiveness varied by indicator (community linkages, self-management support, and delivery system design).

Community linkages implementation effectiveness and self management support implementation effectiveness also each had statistically significant, positive relationships with the following IP&Ps: (1) incentives; (2) performance reviews; (3) access to financial resources; (4) access to administrative human resources; (5) access to clinical human resources; (6) top managers’ support for an environment that encourages innovation implementation; and (7) top managers’ support in the form of technology. In addition, community linkages implementation effectiveness also had statistically significant, positive relationships with (1) access to training in changing health systems and (2) access to training in encouraging providers to correctly use HDC tools. Delivery system design implementation
effectiveness had statistically significant, positive relationships with the following IP&Ps: (1) performance reviews; (2) access to administrative human resources; and (3) access to clinical human resources; (4) access to training in encouraging providers to correctly use HDC tools; (5) top managers’ support for an environment that encourages innovation implementation; and (6) top managers’ support in the form of technology.

Indicators of implementation effectiveness had statistically significant relationships with different control variables. The effective implementation of community linkages was less effective among middle managers who were providers, and delivery system design implementation was less effective among middle managers in rural locations.

5.3.2. Correlates of middle managers’ commitment to innovation implementation

The following IP&Ps had a statistically significant, positive relationship with middle managers’ commitment to innovation implementation: (1) performance reviews and (2) top managers’ support for an environment that encourages innovation implementation (see table 5.3). Bivariate relationships between middle managers’ commitment to innovation implementation and other IP&Ps and between middle managers’ commitment to innovation implementation and control variables were not statistically significant.
Table 5.3. Means, standard deviations, and pairwise correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Community linkages implementation effectiveness</td>
<td>7.10</td>
<td>2.12</td>
<td>2</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Self-management implementation effectiveness</td>
<td>6.26</td>
<td>2.20</td>
<td>0</td>
<td>11</td>
<td>0.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Delivery system design implementation effectiveness</td>
<td>5.37</td>
<td>2.41</td>
<td>1</td>
<td>11</td>
<td>0.49</td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Middle managers’ commitment to innovation implementation</td>
<td>2.67</td>
<td>0.89</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Incentives</td>
<td>2.75</td>
<td>0.89</td>
<td>1</td>
<td>5</td>
<td>0.15</td>
<td>0.19</td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>6. Performance reviews</td>
<td>2.94</td>
<td>1.15</td>
<td>1</td>
<td>5</td>
<td>0.31</td>
<td>0.36</td>
<td>0.27</td>
<td>0.37</td>
</tr>
<tr>
<td>7. Access to financial resources</td>
<td>2.25</td>
<td>0.99</td>
<td>1</td>
<td>5</td>
<td>0.19</td>
<td>0.23</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>8. Access to administrative human resources</td>
<td>3.74</td>
<td>0.75</td>
<td>2</td>
<td>5</td>
<td>0.35</td>
<td>0.37</td>
<td>0.32</td>
<td>0.12</td>
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<td>0.00</td>
<td>-0.04</td>
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<tr>
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<td>-0.01</td>
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<td>0.25</td>
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**Table 5.3, continued**

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<td>0.02</td>
<td>-0.05</td>
<td>0.14</td>
<td>0.13</td>
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<tr>
<td>21. Provider</td>
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<td>0.02</td>
<td>-0.05</td>
<td>-0.10</td>
<td>0.00</td>
<td>0.15</td>
<td>0.18</td>
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<td>0.04</td>
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<td>0.18</td>
<td>-0.16</td>
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<td>0.09</td>
<td>0.13</td>
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<tr>
<td>25. Learning session HDC team motivation^d</td>
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<td>0.03</td>
<td>0.11</td>
<td>0.00</td>
<td>0.08</td>
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**Table 5.3, continued**

<table>
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<td>-0.08</td>
<td>0.08</td>
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</tbody>
</table>

^a^n=120. Bold correlations between dependent and key independent variables are significant at p < .1.
^bIn years.
5.4. Ordinary least squares regression

5.4.1. Specification tests

Factor analyses and Cronbach’s alpha were used to assess variables’ psychometric attributes. Cronbach’s alphas for each factor are summarized in table 4.4. All variables had satisfactory psychometric attributes: All had factor loadings exceeding .44 after varimax rotation, and coefficient alphas indicated that internal consistency was satisfactory (range = .61 to .88).

Table 5.3 displays means, standard deviations, and correlations. Some variables were correlated, but no variables in the data were critically collinear ($r < .6$). Further, variance inflation factors (VIF) were all less than 2.2 (10 is the VIF above which multicollinearity is considered a problem (Kennedy, 1998)). I added key independent variables one at a time to ensure stability in coefficients and standard errors. The results of these measures suggested that multicollinearity was not a problem in the final models.

The small size of the sample limited the statistical power of the analysis and increased the possibility of Type I error (i.e., failure to support the hypothesis when the hypothesis is true). As an alternative, bivariate analyses were used to determine which independent variables to include in multivariate analyses ($p < .1$). I chose this approach to achieve adequate statistical power and to ensure stability in coefficients and standard errors. Marker variables were included in each model to account for common method variance regardless of whether or not they had statistically significant bivariate relationships with dependent variables.

Tables 5.4.1-5.4.4 display final multivariate OLS regression model results. In my first hypothesis, I postulated that middle managers’ commitment to innovation implementation would be positively related to implementation effectiveness. My results partially supported
this hypothesis: When controlling for health center and middle manager factors, middle managers’ commitment to innovation implementation had a statistically significant, positive relationship with community linkage implementation effectiveness. The relationship between middle managers’ commitment to innovation implementation and self-management support implementation effectiveness identified in bivariate analyses, however, was not significant when controlling for health center and middle manager factors. The relationship between middle managers’ commitment to innovation implementation and delivery system design implementation effectiveness was not statistically significant in multivariate analyses.

Table 5.4.1. Predictors of community linkage implementation effectiveness: Ordinary least squares regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SE</th>
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<tbody>
<tr>
<td>Middle manager commitment to innovation implementation</td>
<td>0.44*</td>
<td>(0.21)</td>
</tr>
<tr>
<td>Incentives</td>
<td>0.17</td>
<td>(0.20)</td>
</tr>
<tr>
<td>Performance reviews</td>
<td>0.26*</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Access to financial resources</td>
<td>0.36*</td>
<td>(0.20)</td>
</tr>
<tr>
<td>Access to administrative human resources</td>
<td>0.67*</td>
<td>(0.37)</td>
</tr>
<tr>
<td>Access to clinical human resources</td>
<td>-0.18</td>
<td>(0.35)</td>
</tr>
<tr>
<td>Access to health system training resources</td>
<td>0.58*</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Access to provider training resources</td>
<td>-0.53*</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Top manager support for an environment that encourages innovation</td>
<td>0.40*</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Top manager support in the form of technology</td>
<td>-0.27</td>
<td>(0.26)</td>
</tr>
<tr>
<td>Occupation: Provider</td>
<td>-0.98*</td>
<td>(0.41)</td>
</tr>
<tr>
<td>Board of directors' involvement*</td>
<td>-0.09</td>
<td>(0.21)</td>
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</table>

*p < .1
n=120
*Marker variable.

Table 5.4.2. Predictors of self-management implementation effectiveness: Ordinary least squares regression results

<table>
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<th>SE</th>
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<tbody>
<tr>
<td>Middle manager commitment to innovation implementation</td>
<td>0.15</td>
<td>(0.23)</td>
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</table>
Hypotheses 2 through 8 predicted that the following IP&Ps would be positively related to middle managers’ commitment to innovation implementation: incentives; performance reviews; access to financial, human, and training resources; local social network involvement; top managers’ support; interactions between incentives and all other IP&Ps; and interactions between performance reviews and all other IP&Ps. My results supported
only one of these hypotheses: Performance reviews had a statistically significant, positive relationship with middle managers’ commitment to innovation implementation; the relationship between middle managers’ commitment to innovation implementation and top managers’ support for an environment that encourages innovation implementation found in bivariate analyses were not statistically significant in multivariate analyses.

Table 5.4.4. Predictors of middle manager support for innovation implementation:
Ordinary least squares regression results

<table>
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<tr>
<td>Top manager support for an environment that encourages innovation implementation</td>
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<tr>
<td>Board of directors’ involvement(^a)</td>
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<td>(0.09)</td>
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</table>

\(^a\)Marker variable.
\(^*\)p < .1
n=120

5.5. Summary

Descriptive statistics indicated that implementation effectiveness was suboptimal, middle manager commitment was variable, and access to IP&Ps was generally lacking in middle managers’ health centers. Multivariate analyses indicated that middle managers’ commitment to innovation implementation had a statistically significant, positive relationship with one indicator of HDC implementation effectiveness, and performance reviews had a statistically significant, positive relationship with middle managers’ commitment to innovation implementation.
6.1. Overview

Aim 2 was to enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. For Aim 2, I conducted semi-structured interviews with sixteen of the middle managers included in Aim 1 and used template analysis (N. King, 1998), which identifies some themes a priori from interview questions and allows additional themes to emerge as analysis proceeds. This chapter describes Aim 2 results.

6.2. Study sample

Table 6.2 displays descriptive statistics from Aim 1 surveys for the middle managers who were included in Aim 2 interviews. A total of 16 middle managers were interviewed: Four of the 16 middle managers exhibited low commitment to Health Disparities Collaborative (HDC) implementation, and their health centers exhibited low HDC implementation effectiveness; four exhibited low commitment to HDC implementation, and their health
centers exhibited high HDC implementation effectiveness; four exhibited high commitment to HDC implementation, and their health centers exhibited low HDC implementation effectiveness; and four exhibited high commitment to HDC implementation, and their health centers exhibited high HDC implementation effectiveness (see figure 4.3).

I used two methods to assess differences among these quadrants with respect to the following constructs: (1) IP&Ps (incentives; performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support); (2) organizational turnover and size (control variables that were included in Aim 1 analyses and were identified in Aim 2 interviews as influential in middle managers’ commitment to HDC implementation); (3) potential moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation ([a] whether IP&Ps are under top managers’ control and [b] whether middle managers perceive top managers to be agents of the organization); and (4) potential mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation ([a] job involvement, [b] job-related affect, and [c] strain). As I describe in detail below, neither method revealed many differences among quadrants.

First, using Aim 1 survey data, I used a one-way analysis of variance to assess differences among quadrants with respect to the seven IP&Ps and organizational turnover and size. Taken together, these constructs represent nine variables. The results indicate differences among quadrants with regard to four variables: (1) Performance reviews: Whereas middle managers in all other quadrants reported that they “neither agreed nor disagreed” that performance reviews addressed HDC performance, middle managers in the low commitment to HDC implementation/low HDC implementation effectiveness quadrant
typically reported that they “disagreed” that performance reviews addressed HDC performance (p=0.063). (2) Access to administrative human resources. Whereas middle managers in all other quadrants generally reported that administrative human resources “support[ed] activities with words and actions,” middle managers in the low commitment to HDC implementation/low HDC implementation effectiveness quadrant typically reported that administrative human resources either only “promote[d] activities verbally” or “grudgingly participate[d]” in HDC activities (p=0.069). (3) Local social network involvement: Middle managers in the two high commitment to HDC implementation quadrants had less local social network involvement than middle managers in the two low commitment to HDC implementation quadrants; an average of 2.25 and 1.75 health sites, respectively, were eligible to participate in the HDC in the high commitment to HDC implementation quadrants, whereas an average of 4.5 and 5.25 health sites, respectively, were eligible to participate in the HDC in the low commitment to HDC implementation quadrants (p=0.077). (4) Organizational size: Middle managers in the two low HDC implementation effectiveness quadrants had a greater number of unduplicated patients per year (approximately 30,000 each) than middle managers in the two high HDC implementation effectiveness quadrants (approximately 10,000 each) (p=0.025). I discuss differences among quadrants with respect to these variables in section 6.5.

Second, using Aim 2 interview data, I assessed the degree to which constructs emerged (construct strength) in each quadrant and the degree to which middle managers in each quadrant emphasized the constructs (construct valence) to determine whether there were differences among quadrants with respect to the following variables: (1) the seven IP&Ps; (2) two potential mediators of the relationship between seven IP&Ps and middle managers’
commitment to innovation implementation; and (3) three potential moderators of the relationship between the seven IP&Ps and middle managers’ commitment to innovation implementation. Taken together, these constructs represent 42 variables. Of these, results revealed differences among quadrants with respect to only four variables. They included the following: (1) two IP&Ps (access to financial resources and access to human resources); (2) one moderator of the relationship between IP&Ps and middle managers’ commitment to innovation implementation (whether access to human resources was under top managers’ control); and (3) one mediator of the relationship between IP&Ps and middle managers’ commitment to innovation implementation (middle managers’ job-related affect in response to top managers’ support). I discuss differences among quadrants with respect to these IP&Ps, moderators, and mediators in sections 6.5, 6.6 and 6.7, respectively.

Results from the two methods were inconsistent in that they identified distinct sets of variables by which quadrants differed; however, the methods were consistent because they both identified relatively few differences among quadrants. The scant variation among quadrants might be attributed to the narrow set of indicators used to measure middle managers’ commitment to HDC implementation. As I discuss in detail in section 6.4 below, in addition to regularly using the HDC listserv, virtual classroom, and web page, the middle managers whom I interviewed identified several other activities in which they engaged to demonstrate their commitment to HDC implementation; the regular use of an HDC listserv, virtual classroom, and web page were not comprehensive indicators of middle managers’ commitment to HDC implementation. As a result, some middle managers in the high commitment to HDC implementation quadrants indicated that they were uncommitted to HDC implementation. For example, one middle manager in the high commitment to HDC implementation quadrant...
implementation/high HDC implementation effectiveness quadrant expressed strong resentment toward the HDC. The middle manager indicated that, early in her health center’s participation, top managers hired a data entry clerk without consulting her beforehand. In response, the middle manager reported abandoning efforts to engage in activities that would promote HDC implementation before resigning from the health center. Similarly, some middle managers in the low commitment to HDC implementation quadrants offered evidence of commitment to HDC implementation. One middle manager in the low commitment to HDC implementation/low HDC implementation effectiveness quadrant, for example, reported engaging in a multitude of activities to promote HDC implementation in her health center, such as meeting regularly with top managers in her health center to ensure implementation progress, regularly presenting HDC updates at all-staff meetings, and soliciting grant funding to supplement Bureau of Primary Health Care funding; she called the HDC her “baby.” Although this evidence may seem to suggest that survey data may be unreliable, as I discuss further in section 6.4 below, the indicators that I used for middle managers’ commitment to innovation implementation were relevant: Using the HDC listserv, virtual classroom, and web page represented middle managers’ effort to enable health center employees to implement the HDC as effectively as possible.
Table 6.2. Descriptive statistics from Aim 1 surveys for middle managers included in Aim 2 interviews

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R = Rural; U = Urban; A = Administrator; P = Provider; O = Other clinical
6.3. Chapter outline

In section 6.4 below, I describe the activities in which middle managers engaged to demonstrate their commitment to HDC implementation.

In section 6.5, I use Aim 2 results to enhance Aim 1 results. For example, Aim 2 results often offered insight into why relationships between some IP&Ps and middle managers’ commitment to HDC implementation were not statistically significant. I also identify potential mediators and moderators of the relationship between IP&Ps and middle managers’ commitment to HDC implementation that emerged from Aim 2 analyses but were not proposed by the theory of perceived organizational support. I also describe differences among quadrants with respect to the relationship between IP&Ps and middle managers’ commitment to HDC implementation whenever relevant in section 6.5.

In sections 6.6 and 6.7, I report the results of analysis of potential moderators and mediators, respectively, of the relationship between IP&Ps and middle managers’ commitment to innovation implementation, and I describe differences among quadrants with respect to these relationships whenever relevant in sections 6.6 and 6.7.

6.4. Aim 2 insights into the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness

Aim 1 results indicate that middle managers’ commitment to HDC implementation increased implementation effectiveness. Aim 2 results support this finding by conveying the breadth and depth of activities in which middle managers engaged to promote HDC implementation. Aim 2 also enhances Aim 1 results by identifying several other activities in
which middle managers engaged to promote HDC implementation. The middle managers whom I interviewed confirmed that the regular use of an HDC listserv, virtual classroom, and web page accurately represented their commitment to HDC implementation, as I operationalized it in Aim 1; several middle managers explained that using these online HDC tools represented their effort to enable health center employees to implement the HDC as effectively as possible. An HDC listserv, for instance, offered middle managers the opportunity to post questions to middle managers in other health centers regarding HDC implementation, share success stories regarding approaches to the HDC that worked in their health centers, and offer suggestions to other middle managers regarding how they might solve HDC implementation-related problems. One middle manager explained why her use of online tools was representative of her commitment to HDC implementation:

“[The listserv] was wonderful because all you had to do was go in and pose a question, like, ‘How do you get the people who work nights investing?’ And then four or five clinics would come back with, ‘We did this. We did that. We did this, we did that.’ And then you go…in our little collaborative group and we’ll say, ‘This is what these people did. How do we want to do it? Or what do we want to do?’ It would be where you exchanged ideas, policies, processes, that was the huge thing was the process exchange within a clinic because you get other clinic’s ideas and you’d think, okay, we can probably do a little bit of that and a little bit of this and make it work here. It was wonderful because you had more minds to think of ideas, and it was just great…I went to the website quite often, too, and got their education material and stuff like that.” (059)

In addition to the regular use of these online tools, the middle managers whom I interviewed identified several other activities representing their commitment to HDC implementation, including the following activities: (1) developing and maintaining patient data registries; (2) changing health center systems; (3) soliciting funding; and (4) engaging in emotional work. Middle managers intended for each of these activities to promote HDC implementation in their health centers. I describe each of these activities in detail below.
6.4.1. Developing and maintaining a patient data registry

I asked middle managers to describe their main duties associated with the HDC. Almost all middle managers indicated that developing and maintaining a registry of patients in their health center with the chronic disease of interest (i.e., asthma, cancer, cardiovascular disease, diabetes, or depression) was a key duty. Middle managers intended for developing and maintaining a patient data registry to promote HDC implementation by, for example, allowing receptionists to anticipate when patients with chronic disease would require follow-up appointments. Patient data registry development and maintenance involved the following activities: (1) collecting patient data; (2) entering patient data; (3) generating reports for submission to national HDC employees; and (4) troubleshooting registry software. I describe each of these patient data registry-related activities in detail below.

Collecting baseline patient data

When the HDC began, in 1998, many participating health centers lacked the information technology required for efficient patient data collection. Almost all health centers used paper health records. As such, collecting patient data for these health centers involved sifting through paper health records to determine whether or not a patient had the chronic disease of interest and manually adding pertinent patient data to a database. For example, middle managers or their deputies in health centers involved in a diabetes HDC determined whether patients had diabetes by manually auditing health records for the patients’ most recent hemoglobin A1C levels. Regularly ordering hemoglobin A1C labs was not yet standard practice in many health centers, however, compounding the difficulties associated with the
manual identification of patients with chronic disease; lack of these standard practices was precisely the reason for participating in the HDC. One middle manager explained:

“The first thing I had to do was figure out how I could pull all the diabetic patients. We had a patient management system, but we didn’t have one that would actually give us reports. So the first step...[was to] pull every chart in the clinic, make sure we had a diabetic sticker on the outside of the chart, and then also develop a patient list from all these charts, and then [determine] whether or not they were still active patients... That...first time...was so amazing [because we realized] that maybe we really weren’t doing things correctly because we had maybe one hemoglobin A1c in two years.” (059)

**Entering patient data**

Once a patient data registry had been established, middle managers were charged with ensuring that health center employees populated the patient data registry with patient data. This involved the following activities: (1) replacing old patient forms with new patient flow sheets that captured pertinent data; (2) ensuring that new patient flow sheets were made available to providers; (3) ensuring that providers used the new patient flow sheets; (4) rerouting patient health records after patient visits; and (5) correctly entering patient data into the patient data registry database. HDC administrators provided patient flow sheets that health center employees could modify based on local needs. Many middle managers, however, struggled to get medical assistants to place the new patient flow sheets in patient health records for providers’ use. And almost all middle managers faced resistance from providers to using the new patient flow sheets. Since most health centers had paper patient health records during HDC implementation, entering the data was extremely time-consuming. Several middle managers were able to hire employees for patient data entry purposes, but most middle managers had to solicit time from existing HDC team members or enter patient data themselves. One middle manager remembered:
“I mean, it was a huge task, and I’m not sure we really did it as well as we could as far as keeping the registry up to date, and certainly I couldn’t really get any of the other primary-care providers to even agree to enter data or update it. We tried many things as far as cheat sheets, and diabetes flow-chart sheets that then [the nurse] and I would go and enter, and then for a while we might have a nurse, or an RN, or an MA. It sort of depended upon the nursing staff at the time, and how committed they were to keeping the registry up, and really embracing this method of care.” (109)

Another middle manager remembered:

“And so the clamor to gather data was always the issue. [W]hen we had charts, it was chasing the chart…[A]utomatically, the chart would come to me and I would enter the data. But then there would maybe be charts stacked up, and maybe you’d have 50 charts to enter data, and somebody comes and takes a chart because they need the chart, and so you’d lose that data until the next time it came around…It was definitely a challenge. Hard work. Hard work.” (141)

Generating reports

Health centers participating in the HDC were required to generate monthly reports using patient data registry data. Many middle managers were ambivalent about generating the reports. On the one hand, generating reports provided an opportunity to reflect on changes in patient outcomes subsequent to HDC participation. On the other hand, generating reports was extremely time-consuming and sometimes did not yield information that helped middle managers to promote implementation. One middle manager recounted:

“We had to enter [patient data] in the computer, and then we pretty much had to [generate the reports] all by hand… All the calculations because I remember printing out all the spreadsheets, taping them altogether… Just to figure out my average hemoglobin A1C… [But] the fact that it was measured and that we could report back and say look we’re not doing our foot exams…[was] something very powerful…[But] that was on top of me seeing twenty people a day, and I was salaried, and I didn’t get overtime. I was there until eight, nine, ten o’clock at night generating these reports.” (095)

Another middle manager felt that monthly reporting was not helpful. As such, she began reporting on a quarterly basis because she believed that doing so offered a clearer picture of trends than monthly reporting did.
Troubleshooting patient data registry software

Clinical information systems are one component of the chronic care model. The intended functions of clinical information systems are as follows: To (1) provide a picture of a patient’s health to care providers; (2) summarize evidence-based guidelines for the appropriate care based on a patient’s health conditions; (3) generate a list of patients in need of care; (4) generate summary statistics of individual patients and subgroups of patients; and (5) generate summary statistics to assess health disparities among subpopulations. The Patient Electronic Care System (PECS) was developed by The Aristos Group, Inc. through a cooperative agreement between the Bureau of Primary Health Care. PECS was specifically designed to help health centers adopt the chronic care model to improve the care of patients with chronic diseases. Several complications related to PECS, including incompatibility with earlier patient data registries and poor access to PECS technical support at times, made troubleshooting registry software a frequent task for middle managers who were attempting to promote HDC implementation.

Several middle managers indicated that they did not immediately have access to PECS. As such, they began collecting patient data using rudimentary databases in Microsoft Excel or Microsoft Access and then had to transfer their patient data to PECS when it became available. One middle manager recalled:

“The system that we had at that time to enter our data was just a basic Excel spreadsheet. The computer was not very good. We lost data. I mean it was very, very frustrating at first. I felt like at one point we just had to scratch it all and start again with our data. That was very, very frustrating [because] I still had the day-to-day duties along with my position.” (085)
Another middle manager recalled an experience related to the transition to PECS at a regional HDC meeting:

“...I went to one meeting where they talked about [how] everybody had different computer systems and they wouldn’t talk to each other and they hired this…speaker to come in to talk about IT and he said, ‘Well whatever you’re currently doing is not going to work.’ There were tears because of all the time and effort that these people made in trying to put this data into a computer…All the time and effort and work we did and to hire someone to come up and tell you whatever you’re doing is not going to work.” (095)

Middle managers whom I interviewed indicated that they received a general introduction to PECS at a national HDC meeting and ongoing information technology support from national organizations such as the Bureau of Primary Health Care and regional organizations such as the MidWest Clinicians Network; however, middle managers indicated that information technology support waned as HDC funding declined. As a result, middle managers reported spending ever-increasing amounts of time troubleshooting problems associated with PECS, often with disappointing results. The Bureau of Primary Health Care, however, continued to require monthly reporting, compounding many middle managers’ anxiety about PECS.

6.4.2. Changing health center systems

Most middle managers indicated that changing patient care delivery and administrative systems comprised a large portion of their HDC-related activities. All aspects of a health center’s operations had to change to promote HDC implementation. For example, receptionists had to understand a new scheduling system that involved more preventive visits, appointment reminder calls, and letters; medical assistants had to ensure that new patient flow sheets were included in patients’ health records; providers had to change the way that they cared for patients, including engaging patients in self-management; and lab
technicians had to keep up with increased demands for more regular testing. As one middle manager put it, “It was a whole different ball game...[that] we had to play” (059). One middle manager summarized these often complex and controversial changes:

“[W]e had to step away from trying to focus on, ‘How many patients can you get in for an eye exam, dental exam?’ [toward] ‘How can we affect hemoglobin A1C in the mind frame of case management?’ So we had to get more creative in saying, ‘How can we create standing orders or nursing staff to implement these procedures?’ So it was just kind of guiding the team and thinking of it differently that would make our changes benefit the providers.” (156)

Another middle manager provided a specific example of this process:

“[At first] the PECS sheet was inside the chart, and sometimes...the doctor...would send the chart back up front and that PECS sheet would be inside the chart, so we would never see it until the next visit. So what they do [now since] I realized this is, whenever the patient first comes in, that PECS sheet gets pulled out and put on the front of the chart when we're weighing the patient. And then, if it does make it back up to the front, it's on the outside of the chart, and the girls up front know to get that sheet back to the nurses. So that eliminated that problem.” (064)

Despite the difficult work associated with changing health center systems, middle managers often reported feeling gratified by the experience. One middle manager said:

“So we made the shift from just acute episodic care and this was huge, you know, from acute episodic care to anticipatory care...so now they had an A1C to discuss and lipid profiles...[T]hat improved the amount of data we would get for diabetes management on the medical side...We were able to identify the people who were still our active patients who did not have a hemoglobin A1C done in the last six months and out of our twelve hundred patient population that group was only sixty-five. I think that’s pretty impressive.”

6.4.3. Soliciting funding

Middle managers’ solicitation of grant funding to supplement Bureau of Primary Health Care funding also represents commitment to implementing the HDC. Middle managers intended for soliciting grant funding to promote HDC implementation by, for example, enabling patients to obtain care from specialists that would otherwise be prohibitively
expensive. For example, one middle manager applied for several grants to help patients with diabetes to obtain expensive but critical glucometer test strips, shoes specifically designed for patients with diabetes, and eye surgeries. That middle manager said:

“I’ve always felt that [if] it’s something that’s working and there’s something good there, we’ve got to find a way to do it. And because we’re community centers, and we’re always poor, and there’s never enough staff, and we’re always under-staffed, over-worked, and under-paid, that was nothing new. So, I figured, ‘I’m sure I can come up with something.’” (097)

6.4.4. Emotional work

Middle managers described engaging in a great deal of emotional work in an effort to implement the HDC. Managing employees – including engaging in power struggles with providers and top managers – and self-monitoring represented commitment to HDC implementation. Middle managers intended for these activities to promote HDC implementation by, for example, encouraging clinical employees to provide self-management support to patients with chronic diseases. I describe each of these emotional work-related activities in detail below.

Managing employees

Part of expressing commitment to HDC implementation among middle managers was rallying health center employees around HDC implementation. Many middle managers indicated that health center employees were resistant to HDC implementation. One middle manager recalled that provider resistance to HDC implementation made her question her decision to serve as Team Leader. Despite her ambivalence, she, like many other middle managers whom I interviewed, used weekly meetings, daily in-clinic reminders (e.g., “Don’t
forget to update your [patient’s] health management goal.” [064]), and water-cooler chats to convince employees that the HDC should not be viewed as additional work, but rather as a means of improving patient care systems and patient outcomes. One middle manager remembered initial resistance to HDC implementation among health center employees:

“There was a lot of questions. ‘I don’t understand this, how come we’re doing this?’ ‘So we do it in this phase one, phase two, phase three, why don’t we just do it one time or does it have to be done three times?’ They were good questions. ‘Why are we working so hard? Why can’t we just do it like this?’ But we listened. I do want to tell you we listened, because we were having a hard time, and if we didn’t listen from the people that were actually conducting a lot of these things [implementing the HDC]… We wanted to try and make it better.” (097)

Another recalled coercing health center employees to comply with HDC-related changes by keeping employees apprised of their rates of compliance with HDC processes:

“[W]henever you bring out a new flow sheet or a new idea or a way of doing something, first of all, a lot of times it’s interpreted as more work, or change is difficult for most people, so you had to make it as positive as possible letting them know why we were doing this and then showing them the results. That was very, very important as to keep them frequently aware of what our percentages of compliance were. At that point, it almost became a challenge to them because they would want to beat the other health center sites.” (085)

Middle managers often indicated that some providers and top managers were particularly difficult to engage. According to middle managers, some providers felt that the Bureau of Primary Health Care, top managers, or middle managers were dictating how they should practice medicine. One middle manager who had a particularly good relationship with a resistant physician remembered encouraging her:

“You read all the time…even at home you read all these medical journals and everything. Don’t you see things changing? There’s always a new medicine, a new technique, a new procedure. Well, that’s what this [the HDC] is basically saying. There’s something new, it’s been proven to work better, so we just got to do the best we can do.”

Another middle manager confronted a resistant provider:
“I said, ‘So prove to me that your average blood pressures is less than 140 over 90. Prove to me that your hemoglobin A1C averages less than seven. Tell me what it is.’ [She said,] ‘Well, I can’t.’ I said, ‘I know you can’t, but I can and that’s the number that the feds want to know.’ And I said, ‘It took us a month to be able to do that. In a month, you’ll be able to do that.’ And she said, ‘Oh, okay.’” (015)

Power imbalances made such frank interactions difficult for most middle managers, however. In these cases, many middle managers used a less confrontational approach.

Allowing improved care delivery systems and patient outcomes to speak for themselves was a popular approach to convincing providers of the HDC’s benefits. One middle manager recalled circumventing resistant providers until improved processes and patient outcomes could convince the providers:

“[I]t was easier to go through the nursing staff, and then as physicians started seeing this flow sheet come on the surface of their chart, well it took about three visits for it before you could see a pattern like this A1C is fluctuating and his blood pressure is fluctuating or whatever. It took three or four, even up to five visits, so it was like a year and a half into the whole process before the light bulbs went on with the physicians to say, ‘I can see the value of this tool now,’ but they weren’t about to take the time to do it. We had to tackle it through the nursing department.” (020)

Another middle manager waited for an opportunity to take a resistant chief financial and operating officer to a national HDC meeting:

“[H]e told me one time, he said, ‘Well, I’ve got to believe that our providers provide quality care.’ It was just kind of taken for granted…[During the national HDC meeting, though, he] learned…that you can’t just take that for granted, that it’s our responsibility…to provide our providers with the tools they need to do a good job.” (100)

Top managers were not necessarily completely in favor of HDC participation. Indeed, top managers did not always initiate HDC participation; ultimately, the Bureau of Primary Health Care required health centers to participate in the HDC, and prior to the mandate, as long as top managers agreed for their health centers to participate in the HDC, other health center employees could initiate HDC participation. Yet another middle manager found that the most effective tactic to convince top managers of the benefits of the HDC was to wait
until institutional pressures required the quality improvement methods espoused in the HDC.

She said:

“[E]verything is data driven anymore… We know that as a result of the [HDC] that many private companies, insurance companies, have become pay for performance, you know looking at private docs and saying you know we’ll monitor claims data and we’ll look at how well you do monitoring these chronic diseases, and if you do a good job we’ll give you a little extra money at the end of the year for saving us some money. So I mean that’s the way of the world now…[Top managers] can see all of that.” (087)

Self-monitoring

The middle managers whom I interviewed were keenly aware of the effect of their own feelings about the HDC on the potential for the HDC to be effectively implemented. As a result, many middle managers engaged in self-monitoring. In some respects, this involved stifling their emotions for the sake of frontline employees. For example, one middle manager recalled being upset about her experience at a national HDC meeting. She anticipated that her negative feelings might adversely affect HDC team members’ willingness to implement the innovation, so she monitored herself:

“[E]verybody would ask how’d it go and…I’d realize that by my short statements, I was making a negative effect, and I tried to hold off on that. I really did. Because I didn’t want to bring negativity into it because we’re working hard enough, we don’t need to be beating our heads against a wall with negative thoughts and not get the job done.” (059)

In fact, many middle managers described role modeling for other health center employees as a key component of expressing their commitment to HDC implementation. One middle manager said, “[I]f I don’t model [the] behavior [that will promote HDC implementation], then I don’t have much credibility” (100).

In other respects, self-monitoring involved middle managers being open about what they were and were not willing to do to promote HDC implementation. One middle manager, for
example, felt that participating in mandatory national HDC conference calls would detract from other activities that were more critical to promoting HDC implementation, such as data collection:

“I told the executive director that I didn’t want to [participate in the conference calls]. He said, ‘well if you do this you’re going to do the whole thing.’ [I said,] ‘Then I’m not going to do any of it…I’m either going to do it honestly, or I’m not going to do it at all.’” (106)

As a result, the middle manager and executive director agreed to have another HDC team member substitute for the middle manager on conference calls. The middle manager was “delighted” with the solution. “I go for win/win anytime I can get it,” she said (106).

6.4.5. Summary

Aim 2 findings confirmed that the regular use of an HDC listserv, virtual classroom, and webpage accurately represented middle managers’ commitment to HDC implementation; however, Aim 2 findings also indicated that middle managers engaged in several other activities representing their commitment to HDC implementation. Many middle managers whom I interviewed expressed a willingness to commit to HDC implementation; several spoke with passion for improving the quality of care in their health centers. Two middle managers recalled:

“I felt that it was my project and that I was a piece of it…I’m very proud of things that had been accomplished, like the diabetic flow sheet and…seeing some of those results…just because of watching over the patients closer.” (061)

“I felt a part of the collaborative immediately as soon as I took over…and then taking our quality improvement program from paper to electronics professionally. It was just a huge, huge self-development thing. Being able to work in a systems kind of way within the organization, be a facilitator and seeing people do things that were benefiting patients in the organization and really be part of something bigger. I tell you it, it was such a gas.” (106)
Middle managers’ commitment to HDC implementation, however, came in the face of significant challenges. One middle manager remembered:

“[I]t was long, long days. I was on the road at I’d say five in the morning, and many times I wasn’t getting home until seven at night because…it was like I was the person that kind of got dumped on at the end of the day when everybody else was leaving.”

In fact, some middle managers explained that the challenges were often too great to overcome. As a result, they were sometimes unable to commit to HDC implementation. Two middle managers describe below how their commitment flagged:

“I felt kind of like a gerbil in one of those little rolling things where they just run round and round and round. So yeah, I was pretty worn out and just needed to do some different for a little bit.”

“It just all seemed to have exploded and I developed an extremely negative attitude. I was going to find a new job.”

During interviews, middle managers described how IP&Ps (or lack thereof) and other variables influenced their commitment to HDC implementation. The relationship between middle managers’ commitment to HDC implementation and each of these variables is described below in turn.

6.5. **Aim 2 insights into the relationship between IP&Ps and middle managers’ commitment to innovation implementation**

Aim 2 results provide support for the theory of perceived organizational support: Employees view IP&Ps a sign that their organization cares about innovation implementation. In support of their organization, employees whose organizations offer IP&Ps increase their commitment to innovation implementation. Indeed, the middle managers whom I interviewed described a sense of obligation to health centers that had provided them with ample IP&Ps.
One of these middle managers said that she felt “belonging and importance, [like being a] member of a family” at her health center (059). This sense of obligation often translated to commitment to HDC implementation. Another middle manager, for example, indicated that the respect that she felt in her health center encouraged her to go above and beyond her duties. She said:

“I’ve never had anything but respect here for anything that I’ve been asked to do. And my time is pretty much self-directed, so I just had to make time for everything. [I]f that meant that I did it on Saturday sometimes, I did it on Saturday. But that’s okay. That’s part of my job.” (024)

Another middle manager discussed her gratitude to her health center for supporting her in working part-time. She reciprocated the health center’s flexibility with a willingness to reciprocate with increased commitment to HDC implementation. She said:

“I feel like I have the greatest thing since sliced bread…I mean, it’s just really worked out well. And [working part-time] just a personal decision because my husband is a very, very busy surgeon, and I have a family, and I really can’t do more at this time. So I felt…if you want me to work more…if you want me to add another day, let me know, and I’ll do it.” (109)

In contrast, middle managers whose health centers withheld IP&Ps reported that they experienced decreased commitment to HDC implementation. In an extreme case, one middle manager resigned from her position because so few IP&Ps were available to her. She recalled:

“[L]argely, I was really worn out…[A]fter having worked there for almost 10 years, there was just a lot on my plate, and I just needed to step back a bit…I mean I was a director of three clinics, and then on top of that, running this pretty good sized…program with approximately 10 employees just related to that, plus I had all of the employees at the different clinics. So it was kind of like I really was doing about – I really had a lot. I really had a lot that I was involved with… The coordinator later left for another position near the end, so it all kind of came back to me again, too. Yeah, it was a lot…[I]f things had been divvied up a little bit differently, either from my directorship clinic stuff, or cut back in that way…I think I’d probably still be there today, actually.” (186)
Aim 2 results regarding IP&Ps’ influence on middle manager commitment to innovation implementation partially supported Aim 1 results: One of the IP&Ps that had a statistically significant bivariate relationship with middle managers’ commitment to HDC implementation in Aim 1 analyses – top managers’ support – was one of the IP&P that middle managers discussed most frequently in relation to their commitment to HDC implementation during interviews. The other IP&P that had a statistically significant bivariate relationship with middle managers’ commitment in Aim 1 analyses – performance reviews – was the least frequently discussed during interviews (see table 6.5.1). As I discuss in detail in Chapter 7: Discussion and Conclusion, middle managers may have infrequently discussed performance reviews because they did not explicitly associate performance reviews with the IP&P that most substantially influenced their commitment to innovation implementation: regular and open communication with top managers about their HDC-related performance. In fact, performance reviews may represent this key facet of top managers’ support.

**Table 6.5.1. IP&P identification among interviewed middle managers**

<table>
<thead>
<tr>
<th>IP&amp;P variables</th>
<th>Frequency</th>
<th>Bivariate relationship with middle managers’ commitment to innovation implementation</th>
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</thead>
<tbody>
<tr>
<td>Access to human resources</td>
<td>171</td>
<td>ns</td>
</tr>
<tr>
<td>Top managers’ support</td>
<td>135</td>
<td>p = .037</td>
</tr>
<tr>
<td>Access to financial resources</td>
<td>85</td>
<td>ns</td>
</tr>
<tr>
<td>Access to training resources</td>
<td>54</td>
<td>ns</td>
</tr>
<tr>
<td>Incentives</td>
<td>46</td>
<td>ns</td>
</tr>
<tr>
<td>Local social network involvement</td>
<td>37</td>
<td>ns</td>
</tr>
<tr>
<td>Performance reviews</td>
<td>30</td>
<td>p = .000</td>
</tr>
</tbody>
</table>

ns = not significant
Aim 2 results offered insight into the relationships (or lack thereof) between IP&Ps and middle managers’ commitment to HDC implementation found in Aim 1 analyses. In many cases, Aim 2 results reveal why some IP&Ps may not have had statistically significant relationships with middle managers’ commitment to HDC implementation. In other cases, Aim 2 results suggest that some IP&Ps may have been more significant determinants of middle managers’ commitment to HDC implementation than Aim 1 results suggested. Differences between Aim 1 and Aim 2 findings might be attributed to Aim 1’s small sample size or narrow definition of middle managers’ commitment to HDC implementation. As previously discussed, these results rarely varied by quadrant (high/low middle manager commitment to innovation implementation; high/low implementation effectiveness). Whenever relevant, variation in the relationships between IP&Ps and middle managers’ commitment among quadrants is discussed in the paragraphs that follow.

In addition to enhancing Aim 1 findings using analyses of Aim 2 interview data, the following sections also identify potential mediators and moderators of the relationship between IP&Ps and middle managers’ commitment to HDC implementation that emerged from Aim 2 analyses but were not proposed by the theory of perceived organizational support. Mediators refer to mechanisms that underlie relationships between IP&Ps and middle managers’ commitment to HDC implementation, and moderators refer to variables that alter the strength of the relationship between IP&Ps and middle managers’ commitment to HDC implementation. These variables are displayed in table 6.5.2.
Table 6.5.2. Moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation

<table>
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<th>IP&amp;P variables</th>
<th>Mediators</th>
<th>Moderators</th>
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<tr>
<td>Incentives</td>
<td>Recognition</td>
<td>Specificity of feedback</td>
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<td></td>
<td>Job involvement*</td>
<td>Formality</td>
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<td></td>
<td>Innovation effectiveness</td>
<td>Whether IP&amp;Ps are under top managers’ control*</td>
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<td>Top managers’ support for innovation implementation</td>
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<tr>
<td>Performance reviews</td>
<td>Job involvement*</td>
<td>Access to financial resources for health center initiatives other than the HDC</td>
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<td>Strains*</td>
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<td></td>
<td>Innovation effectiveness</td>
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<tr>
<td>Access to financial resources</td>
<td>Access to human resources</td>
<td>Top managers support for innovation implementation</td>
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<tr>
<td></td>
<td>Decreased workload</td>
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<td></td>
<td>Job involvement*</td>
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<td>Job-related affect*</td>
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<td>Innovation effectiveness</td>
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<td>Top managers support for innovation implementation</td>
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<tr>
<td>Access to human resources</td>
<td>Decreased workload</td>
<td>Knowledge gained</td>
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<td>Job-related affect*</td>
<td>Burden on middle managers</td>
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<td>Strains*</td>
<td>Consistency</td>
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<td>Innovation effectiveness</td>
<td>Access to training resources from sources other than the innovation</td>
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<td>Top managers support for innovation implementation</td>
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<tr>
<td>Access to training resources</td>
<td>Job involvement*</td>
<td>Age of facility</td>
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<td></td>
<td>Job-related affect*</td>
<td>Responsibility of facility for training other health center facilities</td>
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<td></td>
<td>Innovation effectiveness</td>
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<td>Local social network involvement</td>
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<td>Top managers support for innovation implementation</td>
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<td>Top managers’ support for</td>
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<tr>
<td>innovation implementation</td>
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<td>Innovation effectiveness</td>
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<td>Organizational turnover</td>
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<td>Innovation effectiveness</td>
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<td>Centrality of decision-making</td>
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<td>Access to human resources</td>
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<td></td>
<td>Top managers’ support for innovation implementation</td>
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</tbody>
</table>

HDC=Health Disparities Collaborative

*Predicted by the theory of perceived organizational support; all others in the table emerged from Aim 2 analyses
6.5.1. Incentives

I found no relationship between incentives and middle managers’ commitment to HDC implementation in Aim 1 analyses. For several reasons, Aim 2 results support this finding. First, the middle managers whom I interviewed maintained that incentives for committing to HDC implementation were rare; none received financial incentives specifically for committing to HDC implementation, and career promotion opportunities and professional development activities were rarely explicitly offered. In fact, some middle managers reported that even receiving private and public acknowledgement for commitment to HDC implementation was rare in their health centers. One middle manager said:

“…I had been there for five years. People were making more money [than I was]. I was working my ass off. I loved the people that I worked for. I loved the population I was working for. But never to get monetary satisfaction, emotional satisfaction, recognition…” (095)

Second, many middle managers were unwilling to admit that incentives would have increased their commitment to HDC implementation had they been offered. Some middle managers believed that incentives would increase other employees’ commitment, but not their own. For instance, one middle manager indicated that he was in the process of developing financial incentives for providers to follow evidence-based guidelines, stating, “I think anything to kind of shine a light on some of those areas that we really want to show some quality improvement would happen, I think, a financial incentive would” (100). When asked whether a financial incentive would increase his commitment to HDC implementation, however, the middle manager said:

“No [chuckle], not really. Yeah, I don’t think a financial incentive would make me work harder on this project. I mean, I think that we’re really kind of giving it our all. I mean, I feel that I am rewarded. I have a good salary, good benefits, nice place to work. I get to work with this EHR system, which is just an incredible system. So I personally feel
rewarded by all those things. I don’t think that a monetary incentive would necessarily make me do anything different that I’m not doing now” (100).

Many middle managers echoed this sentiment, asserting that commitment to HDC implementation was “just part of the job” and that incentives were “not what [they’re] here for” (085). One said, “I would have done it [committed to HDC implementation] anyway because I felt it was important” (109). As I discuss in the “Other variables” section below, many middle managers attributed this sentiment to their values. Another middle manager said, “I’m a very internally directed person so my rewards came in seeing progress” (106).

Yet another said:

“I know that there are people who need [incentives], so I recognize those people. I know who I need to pat on the back occasionally with ‘Hey Jay…what a great job, it seems like that little in service we had really worked, and keep it up.’ That kind of stuff, I can do that for other people but for myself, I just don’t really, I don’t really feel it.” (087)

Some middle managers, on the other hand, indicated that incentives would have been beneficial to HDC implementation at the health center. For example, one middle manager said that incentives would have helped with patient data collection:

“I think that was the hard part, because we weren't getting any kind of incentives or anything from anybody to keep track of numbers, and then if the numbers fell below this point then you would get money. I'm seeing that now not with the diabetes collaborative, but with some of the insurance companies, if you give them these numbers and participate in what they want you to do, then they have dollars come this way, but they didn't do that back with the [HDC].” (061)

Most commonly, middle managers reported that they would have “appreciated a pat on the back” (095) or public or private acknowledgement for their commitment to HDC implementation.

Other middle managers indicated that incentives would have been “nice,” but that incentives would not have increased their commitment to HDC implementation.

Interestingly, even the middle managers who said that incentives would have somehow
benefitted HDC implementation or would have been “nice” seemed unwilling to suggest that incentives would have increased their commitment to HDC implementation. For example, one middle manager said, “It would have been very nice to have some type of incentive” (059). When asked whether incentives would have increased her commitment to HDC implementation, however, the middle manager denied that that they would. Many other middle managers also denied that incentives would have increased their commitment to HDC implementation but, like the previously quoted middle manager, they said that the incentives would have been “nice.” When asked to expound on this sentiment for more information, only one middle manager was able to verbalize, to some extent, what “nice” meant. The middle manager said with regard to career promotion opportunities or professional development opportunities or financial incentives:

“Well, I think just acknowledgment that the work that you are doing and that you’re getting paid to do, whether it’s the part on the collaborative or other things that you’re doing that people know that the work is getting done and that the results are, you know working in the case of some of the grants that we get that we continue to meet our outcomes, and we continue to get the funding every year. I mean that, to me, is, that’s recognition.” (087)

This may suggest that recognition mediates the relationship between incentives and middle managers’ commitment to HDC implementation (see table 6.5.2): Incentives elicited a sense of recognition from this middle manager. In turn, the recognition may have increased her commitment to HDC implementation.

6.5.2. Performance reviews

I found in ordinary least squares regression (OLS) analyses a positive, statistically significant relationship between performance reviews and middle managers’ commitment to HDC implementation in Aim 1 analyses. Aim 2 results offered little support for this finding:
Although most interviewed middle managers reported that they underwent formal performance reviews, few middle managers indicated that the performance reviews specifically addressed HDC performance. As noted in section 6.2, this was particularly common among middle managers in the low commitment to HDC implementation/low implementation effectiveness quadrant; these middle managers’ health centers may have lacked the infrastructure necessary to provide IP&Ps and effectively implement the HDC.

Among middle managers who reported that their performance reviews addressed HDC performance, few indicated that the feedback increased their commitment to HDC implementation. Specifically, the feedback that most middle managers received regarding their HDC performance during performance reviews was positive. Middle managers found this feedback to be encouraging, but they indicated that the feedback only incited them to persist in their commitment to HDC implementation; no middle manager reported that they used feedback from performance reviews to augment their commitment to HDC implementation. For example, one middle manager said, “I guess it [performance reviews] didn’t change what I was doing. I continued with the steps that I was taking knowing that upper management approved of those” (156). Another middle manager said:

“I would do exactly what I would have done anyway regardless of the performance eval, and I'm going to follow policies and procedures and make sure that the patient's taken care of, and that the staff is doing the right thing. So with or without that eval, I'm still going to make sure that things are done, and done right.” (061)

A few middle managers felt that performance reviews provided them with specific feedback; in turn, the specific feedback increased their commitment to HDC implementation. For example, one middle manager received specific feedback that she needed to be more assertive with HDC team members. She felt that the specific feedback made her “more aware” of the potential to improve her HDC performance (064). Another middle manager
saw performance reviews as an opportunity to “overcome obstacles or to work through processes” with top managers (085). These findings suggest that the specificity of feedback received during performance reviews may moderate the relationship between performance reviews and middle managers’ commitment to innovation implementation (see table 6.5.2): Middle managers who received vague feedback reported that performance reviews did not influence their commitment to HDC implementation, whereas middle managers who received specific feedback about their performance indicated that performance reviews did influence their commitment to HDC implementation.

Many middle managers indicated that informal feedback was more valuable than formal performance reviews. Most middle managers reported that formal performance reviews were inconsistent, contrived, and poorly administered. One middle manager said:

“…the human resource person will turn in the evaluations to [the Chief Executive Officer, and], they sit there on his desk forever. One year goes by, another year, and whatever, I don’t know they get lost or what happens, I don’t know. But really and truly, I’ve only had like – and I think max is four evaluations.” (100)

Another middle manager described the process as “check, check, check”; top managers would often complete performance reviews as an organizational requirement, providing little useful feedback to middle managers (015). Moreover, one middle manager indicated, some top managers were unfamiliar with the HDC and were, therefore, unable to provide substantive feedback on middle managers’ HDC performance.

In contrast, many middle managers described informal feedback as critical. These middle managers explained that informal feedback allowed them to resolve issues before they became problematic enough to report during formal performance reviews, which were often given annually. One middle manager, for example, said:

“I have an extremely supportive supervisor, and I already knew where I stood [during a
performance review], so that [the performance review] wouldn’t have been a surprise; it would have just been a formality.” (024)

These results suggest that formality may moderate the relationship between performance reviews and middle managers’ commitment to innovation implementation (see table 6.5.2): Middle managers who received informal feedback indicated that these performance reviews influenced their commitment to HDC implementation, whereas middle managers who underwent formal performance reviews indicated that the performance reviews did not influence their commitment to HDC implementation. These results also suggest that top managers’ support may moderate the relationship between performance reviews and middle managers’ commitment to innovation implementation (see table 6.5.2): Middle managers with supportive supervisors indicated that performance reviews were constructive experiences; as I discuss in detail in Chapter 7: Discussion and Conclusion, performance reviews may represent regular and open communication with top managers. In contrast, as the quote from interview participant 100 demonstrates above, performance reviews were not helpful to middle managers whose top managers were not supportive.

6.5.3. Access to financial resources

I found no relationship between access to financial resources and middle managers’ commitment to HDC implementation in Aim 1 analyses. Aim 2 results support this finding for several reasons. First, I operationalized access to financial resources as middle managers’ responses to the question, “How much Bureau of Primary Health Care funding was used at your center for HDC related (1) training in quality improvement techniques; (2) information system technical support; (3) data entry activities; and (4) staff time spent on quality improvement?” Most of the middle managers whom I interviewed reported that they did not
know whether the Bureau of Primary Health Care or other sources covered HDC-related expenses. Indeed, 22.5 percent of access to financial resources values in Aim 1’s unimputed dataset was missing.

Second, middle managers often reported that access to financial resources for HDC implementation was limited in their health centers. To be sure, Aim 1 analyses indicated that the mean value for access to financial resources was low (2.25; the maximum value was 5), and there was little variation (s.d. 0.99). One middle manager indicated that financial problems in her health center made the few financial resources that were available less accessible: For example, the Bureau of Primary Health Care provided the health center with funding for two of her health center’s employees to travel to national HDC meetings; however, the resulting loss in health center productivity made travel prohibitive. Another middle manager lamented that constrained access to financial resources limited her ability to link patients with community resources. She said:

“…you want to measure how many patients come in for diabetic dental exams or diabetic eye exams, that’s great, but where do you want to send these people to because there’s no resources. Our dental office here can accept a certain amount of sliding scale patients, but we have two dentists, and we could probably fill 200 dentists’ schedules. Your capacity for being able to get people in for those exams is greatly frustrating.” (156)

Another middle manager said that limited access to financial resources limited her ability to engage in basic HDC activities:

“I would just say it affected the ability to even change your PDSA cycles. So, when you would do a PDSA cycle, you had to focus on a cycle that didn’t require financial resources. So, for example, I remember one time he [an HDC team member] wanted to try just having one of our nursing staff that was on the team and very willing to try to call our depression patients for a follow up on their on their PHQ. Well that’s a really great idea, but when you have 2,500 depression patients, that’s a lot of phone calls, plus she is required to do her other jobs. So I think it works for about a week. Then she was just swamped. So it’s like things like that. Well, that’s a great idea but what are the resources needed?” (156)
Middle managers seemed to take for granted that access to financial resources was limited; as employees in often poorly funded health centers, the middle managers were used to making do with limited access to financial resources. One middle manager said, “I mean, if we don't have the money, we don't have the money. Like at home, if I don't have the money to go buy whatever, then I don't go buy it” (064). Another said:

“…because we’re community centers and we’re always poor and there’s never enough staff, and we’re always under-staffed, over-worked, and under-paid, that was nothing new…That’s why we constantly changed the system as to, were we going to utilize doctors, were we going to use everyone or were we going to use the front staff, were we going to have just a nurse doing practically most of the stuff so we wouldn’t bother the rest of the clinical area. That was our hardest and our biggest challenge, I think, because we didn’t have money, we didn’t have extra people, and we had to be sure we didn’t hinder the process that we already had. At the same time, we want to get this done because we needed to show improvement, and in doing that, it had to continue to be done. But who was going to do it? How were we going to do it? We were constantly changing that process.” (097)

These findings suggest that a moderator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation may be general access to financial resources in middle managers’ health centers (see table 6.5.2). Specifically, results suggest that access to financial resources may have had a weaker effect on commitment to HDC implementation among middle managers who were accustomed to limited access to financial resources in their health centers than among middle managers for whom limited access to financial resources was not as familiar.

Middle managers in the high commitment to HDC implementation/high HDC implementation effectiveness quadrant coped with lacking access to financial resources differently from middle managers in the other quadrants. More consistently than middle managers in other quadrants, middle managers in this quadrant actively pursued opportunities to overcome obstacles associated with lacking access to financial resources. For example,
these middle managers were particularly proactive in applying for grants when access to
other financial resources was limited. Middle managers in this quadrant also reported
experimenting with creative job design to overcome obstacles associated with lacking access
to financial resources. For example, one middle manager took advantage of a program at a
nearby university in which pharmacy students worked at local health care organizations free
of charge. When faced with a staffing shortage and lacking financial resources with which
she might hire more staff, another middle manager said:

“Because…we don’t get people that often, I am always [saying], ‘Okay, how can I get
someone that will still stay within their job description and they can do an additional
thing for me, therefore freeing that other person to be able to do this?... I’m sure that
somehow I can get someone that can put on another hat and help me out halfway. Maybe
I can work my secretary. Maybe I can look at my…” (097)

The commitment among middle managers in this quadrant may have driven them to do what
it took to make HDC implementation effective in their health centers. Alternatively, middle
managers may have drawn upon other IP&Ps in their health centers that were relatively more
ample than access to financial resources, such as top managers’ support or access to human
resources, to compensate for lacking access to financial resources.

When middle managers did have access to financial resources, they frequently used them
to purchase lab equipment that would allow them to obtain timely lab results, to hire patient
data entry employees and clinicians, to purchase or upgrade patient tracking software, and for
travel to national and regional HDC meetings. These middle managers often indicated that
access to financial resources increased their commitment to HDC implementation. One
middle manager used financial resources to hire data entry employees and a project
coordinator. These new hires substantially increased her commitment to HDC
implementation. The middle manager delegated data entry and reporting to data entry
employees and the project coordinator, respectively. As a result, she was able to focus on bigger-picture issues associated with the HDC, such as spreading to another facility in the health center and pursuing grant funding for future HDC needs. This result suggests that access to human resources may mediate the relationship between access to financial resources and middle managers’ commitment to innovation implementation (see table 6.5.2): Access financial to resources allowed middle managers to hire employees, and in turn, the increased access to human resources increased middle managers’ commitment to HDC implementation. It is also possible that decreased workload mediates the relationship between access to financial resources and middle managers’ commitment to innovation implementation (see table 6.5.2): Access to financial resources allowed middle managers to purchase new lab equipment, upgrade patient data registry software, and hire employees; in turn, these resources allowed middle managers to delegate some HDC-related activities to other employees and focus on more pressing HDC-related activities.

For some middle managers, the relationship between access to financial resources and access to human resources was not so straightforward. Some top managers withheld access to financial resources that some middle managers used to hire employees to assist with HDC implementation until the Bureau of Primary Health Care required health centers to participate in the HDC. As a result, middle managers lacked access to the human resources required to commit to HDC implementation. In this sense, top managers’ support may mediate the relationship between access to financial resources and middle managers’ commitment (see table 6.5.2).

6.5.4 Access to human resources
Aim 2 results offered little support for Aim 1 findings that access to human resources did not have a statistically significant relationship with middle managers’ commitment to HDC implementation. Differences between Aim 1 and Aim 2 results might be attributed to Aim 1’s small sample size or its narrow definition of middle managers’ commitment to HDC implementation. Indeed, Aim 2 results indicate that access to human resources influenced middle managers’ commitment to HDC implementation. To improve chronic care, the HDC involved change that permeated health centers: Receptionists had to understand a new scheduling system that involved more preventive visits and appointment reminder calls and letters; medical assistants had to ensure that new patient flow sheets were included in patients’ health records; providers had to change the way they cared for patients, including engaging patients in self-management; and lab technicians had to keep up with increased demands for more regular testing. One middle manager summarized, “[E]verybody in the clinic has a role. This is not just a doctor and a nurses’ role. This program has to be 100 percent of your clinic staff, or it’s not going to work” (059). To achieve the level of teamwork that the HDC required, middle managers reported that two things were critical: (1) having access to human resources and (2) getting health center employees to buy into the premise of the HDC and actively participate. Middle managers described having access to human resources as having a substantial effect on their commitment to HDC implementation. One middle manager who was particularly eager to ensure that patient data were regularly and accurately entered into her health center’s registry, for example, recounted how access to human resources influenced her ability to engage in activities to promote HDC implementation:

“…that point where we were needing help, and [top managers] were really questioning [the need to hire additional employees]…yes the collaborative went on the back burner, it
sure did. We were just so busy and so tired, and I didn’t have the opportunity or the time to try to get through all that [patient data entry], and there was a lot to it. I think yes, that’s one of those dives we took on our rollercoaster with our data, went downhill real quick. But then once we were able to hire that additional staff, the additional provider, nurse, the medical records…then we started going back up that hill with the rollercoaster and started doing better.” (059)

Another middle manager discussed how creating allegiances with departments throughout her health center allowed her to more effectively commit to HDC implementation by conducting more effective patient data registry queries or coordinating patient referrals:

“[T]here are two people in IS that you would call if you needed help, like if your computer crashed or if you needed help developing specialized queries or something like that… I developed champions in some other departments…I developed a relationship with the wound clinic, and that’s taken me a long ways.” (020)

Another middle manager remembered how a particularly helpful nurse minimized the amount of time that the middle manager spent on auditing charts for patient data entry:

“[The nurse] developed a flow sheet. When the patient came in for a visit, the nurse would make a copy of the flow sheet to indicate what measures had been completed or not, and then they came to us for us to put in as far as data entry. That saved us from pulling multiple, multiple charts.” (085)

Yet another middle manager remembered how hiring someone to conduct patient data entry allowed her to more effectively promote HDC implementation: “I was catching up, and maybe we could send timely reminders, and we could get people in that hadn’t been in for a while” (141).

The several middle managers whom I interviewed who reported that limited access to human resources or poor teamwork among health center employees decreased their commitment to HDC implementation represented the opposite side of the same coin. As noted in the comparison of quadrants in section 6.2 above, these reports were particularly common among middle managers in the low commitment to HDC implementation quadrants. One middle manager, for example, described his frustration when lack of participation
among one group of employees in his health center lead to the demise of the HDC as a whole:

“I suddenly noticed there was a couple of month interval where our immunization rates fell back down to almost our baseline. It was like we had done nothing. And I went to my director of nurses and I said, ‘What happened here? What’s going on with immunizations?’ Well, come to find out that the…feedback to the nurses on a regular basis had stopped. And so, just stopping that feedback over a couple month period, we reverted back to baseline.” (100)

These struggles among middle managers in the low commitment to HDC implementation quadrants might be related to their general inability to overcome limited access to IP&Ps. For example, just as middle managers in the high commitment to HDC implementation/high implementation effectiveness quadrant had the general ability to make do with access to financial resources that were as limited as access was among middle managers in other quadrants, middle managers in the low commitment to HDC implementation quadrants may have generally lacked the ability to overcome these obstacles to committing to HDC implementation. General ability to overcome obstacles to committing to HDC implementation could relate to the organizational culture in middle managers’ health centers or facets of middle managers’ personalities.

Getting health center employees to buy into the HDC was also critical to achieving the teamwork that the HDC required. One middle manager remembered that the many providers who did not buy into the HDC pulled her away from activities intended to promote HDC implementation to help with clinical work. Another middle manager explained how the time-consuming process of introducing health center employees to the HDC limited her ability to pursue other activities to promote HDC implementation:

“[E]very time you…hired a new individual, it was training that individual or that new provider, selling them on the collaborative and why it was important, so it took a lot of time… [Y]ou’d think, ‘If we just could keep the same staff and not have to like repeat
stuff the process would go a lot quicker, or the outcomes would change a lot faster…” (085)

Yet another middle manager discussed how lack of buy-in among employees in her health center made her reluctant to serve as team leader:

“Looking back, I just had mixed feelings on [serving as team leader] because the collaboratives were, I guess, to the providers…one of those extra steps we had to do…[that] influenced my feelings a little bit about taking it [the team leader role] over, like, ‘How do I make this thing thrive when everybody already has these preconceived ideas about it? And being that it was mandated by HRSA for grant requirements, it was kind of like one of those things we have to do for our grant, but nobody took real deep stock in figuring out how it could really benefit patient care.’” (156)

Taken together, these results suggest that decreased workload may mediate the relationship between access to human resources and middle managers’ commitment to HDC implementation (see table 6.5.2): Middle managers reported that having access to human resources who bought into the HDC decreased their workload, thereby increasing their commitment to HDC implementation. Some top managers assisted middle managers in getting resistant providers to buy into the HDC. This was sometimes necessary when power imbalances prevented middle managers from doing so. For example, one middle manager remembered:

“[B]elieve me it wasn’t me getting them enthused about it because providers are providers…[O]ur medical director [had] the time and experience to be able to be an influence, an agent for change, and [he said to the providers], ‘Look, we can’t put this off any longer,’ and then [it] that was agreed upon by the providers.” (106)

This suggests that top managers’ support may moderate the relationship between access to human resources and middle managers’ commitment; that is, top managers’ support may have increased administrative and clinical employees’ engagement in HDC implementation, thereby increasing middle managers’ commitment to HDC implementation (see table 6.5.2).
6.5.5. Access to training resources

In Aim 1, I found no relationship between access to training resources and middle managers’ commitment to HDC implementation. Although I did find some evidence that access to training resources increased middle managers’ commitment to HDC implementation, Aim 2 results generally supported Aim 1’s finding that access to training resources did not increase middle managers’ commitment to HDC implementation. The middle managers whom I interviewed indicated that they received the majority of HDC-related training at regional and national HDC meetings. Some middle managers indicated that access to training resources increased their ability to engage in activities that promoted HDC implementation. For example, a middle manager who had no experience in quality improvement asserted that training gave her the confidence to “know what [she was] doing” (020). Another middle manager noted that training offered her the tools necessary to engage in activities that promoted HDC implementation:

“[Before training,] I did not know what a PDSA cycle was to save my life… Report writing with PECS was something I was better at than many other people when we were comparing notes…I definitely picked that kind of stuff up at trainings.” (106)

Another middle manager remarked on the camaraderie she found at meetings: “[I]t was such a big boost to come together and to hear the successful stories and the frustrations that when you feel like you are totally on your own” (061). Another said:

“[J]ust learning what other people do in quality improvement with our same system is very beneficial and learning the mechanics of, ‘How do I do this report? How do I set up best-practice alerts? What are some other things that I can build into our [patient data registry] system to make it easy for people to do the right thing?’” (100)

Yet another middle manager remembered that the trainings “included success stories so you could learn from other health centers and avoid wasting a lot of time on a certain way of doing things” (085).
Nevertheless, most themes in Aim 2 results supported Aim 1’s finding that access to training resources did not increase middle managers’ commitment to HDC implementation. First, several middle managers indicated that their access to training resources was insufficient. One middle manager said, “I don’t feel like everybody [health center employees] got a good education level of what [the HDC] is… I don’t think they understand what the purpose of the collaborative was” (059). Another middle manager remembered how limited access to training influenced her ability to engage in activities that would have promoted HDC implementation: “The software was hard to learn at the beginning and no one really had an idea of how to use it... There was lots of, ‘Wait, wait, wait, this doesn’t work, what am I doing wrong?’” (097). This result may suggest that the amount of knowledge gained from training resources may moderate the relationship between access to training resources and middle managers’ commitment to innovation implementation (see table 6.5.2): Middle managers who gained little knowledge from the training resources to which they had access reported that access to training resources did not influence their commitment to HDC implementation, whereas middle managers who gained the knowledge necessary to do so reported increased commitment to HDC implementation.

Second, some middle managers who did have access to training resources felt that training was often overwhelming. One middle manager remembered her first national training:

“[I]t was…extremely overwhelming…So you come home with this 14-inch binder…to get established, and to learn what to do, and to go through the PDSAs and keep up with all the paperwork, and get your patient population, and all that.” (059)

Another middle manager recalled feeling paralyzed by all of the information at trainings:

“…I think the sense of being overwhelmed by just so much information at first…they had like nine different measures they were trying to track and that was just
overwhelming…just feeling like we were trying to gather data and couldn’t get it all together and couldn’t do anything with it.” (085)

Yet another middle manager said, “[E]very time we went it seemed like there was more and more they were expecting” (095). This result suggests that the burden of the training resources on middle managers may moderate the relationship between access to training resources and middle managers’ commitment to innovation implementation (see table 6.5.2):

Middle managers who were overwhelmed by HDC-related trainings reported that access to training resources either did not influence or negatively influenced their commitment to HDC implementation. In contrast, middle managers who perceived training resources to be helpful and accessible reported that access to training resources positively influenced their commitment to HDC implementation.

Third, middle managers consistently reported that national HDC trainings initially were frequent and well-resourced; as time passed, however, middle managers noticed a decline in their access to training resources. One middle manager remembered:

“[T]hey spent so much money I think, initially, and [then]…the money ran out, [and] then we weren't able to meet because the money was all gone. And that's like a state or federal kind of thing, and I understand that, but I think things [initially] were just a little too elaborate and that they could have been more frugal…so that it could have extended the life of the collaboratives.” (061)

Another middle manager lamented:

“'[W]hen they discontinued those training sessions, I think that was a great blow to the collaboratives because, when you brought new people on, it was hard to get them motivated. When you had the training, you could send members of the collaborative team to have kept that enthusiasm going, I guess.” (156)

Yet another middle manager recalled the change:

“'[I]nitially, …one of the IT guys used to come up to the Midwest like once or twice a year or something, and then that all changed where it became, ‘No, the only way to reach this person is via phone, and no they’re not going to come up and do any site things any
‘longer.’ So, it was an adjustment. I mean, we got what we needed but it…wasn’t the same.” (186)

This result suggests that the consistency of access to training resources may moderate the relationship between access to training resources and middle managers’ commitment to innovation implementation (see table 6.5.2): Middle managers reported that inconsistent access to training resources decreased their commitment to HDC implementation; access to training resources may have had a positive relationship with middle managers’ commitment to HDC implementation if it had been more consistent.

Many middle managers reported compensating for this diminished access to national training resources with training from other sources. State-level training, for example, was a common fall-back. Community Health Centers of Arkansas and Texas Association of Community Health Centers, for example, became important resources for some middle managers in the absence of access to national training resources. Private resources were also helpful to some middle managers. One middle manager recalled attending training for users of her health center’s brand of patient data registry, and another remembered having a Bayer representative train her to use equipment that was purchased for HDC purposes. This result suggests that access to training resources from sources other than innovation of interest may moderate the relationship between access to training resources and middle managers’ commitment to innovation implementation (see table 6.5.2): Access to training resources from sources other than the HDC dampened the negative effect of lacking or inconsistent access to HDC-related training resources on middle managers’ commitment to HDC implementation.

6.5.6. Local social network involvement
I found no relationship between local social network involvement and middle managers’ commitment to HDC implementation in Aim 1. Aim 2 results offer insight into Aim 1 findings: Approximately half of the middle managers who worked in health centers with more than one facility participating in the HDC indicated that the participation of other facilities in the HDC increased their commitment to HDC implementation; the other half indicated that the participation of other facilities in the HDC decreased their commitment to HDC implementation. The net result of these disparate sentiments may have been null in Aim 1 analyses. Many middle managers who indicated that the participation of other facilities increased their commitment to HDC implementation reported that their interactions with HDC teams in other facilities in their health centers were particularly helpful; they remembered meeting with middle managers and HDC teams from other facilities in their health centers to share best practices, tell success stories, and problem-solve, and engaging in friendly competition to achieve HDC-related goals. One middle manager, for example, recalled having pizza parties for the facility with the best compliance with flow sheet completion and patient data entry. Another middle manager recalled the benefits of collaborating with an HDC team at another facility:

“[At our meetings,] we really would try to…figure out ways to educate staff or bring up which points we needed to increase our education because we're seeing one [facility] that's doing so well in the area, and how did they go about increasing their numbers or increase their participation with the staff? And it spurred us to try and figure out different ways, too…” (061)

Yet another middle manager remembered feeling motivated by friendly competition among facilities:

“I produce the reports month to month, and it became a very competitive thing within the sites: ‘Hey, we dropped our average blood pressure from 140 over 90 to 136 over 87, and yours is still 140 over 92.’ And then it became, ‘Well, what are you doing different than we are?’ And so, it became a best way to get best practices out to each of the sites.” (015)
Other middle managers reported sharing HDC-related resources among facilities: “[W]e might have a day where would bring their dental hygienist over to speak to our dental, so it really allowed lots of communication with the other [facilities]” (064).

On the other hand, several other middle managers found that the participation of other facilities in the HDC taxed on their commitment to HDC implementation. This may have been particularly true among middle managers with low commitment to HDC implementation; as I noted in section 6.2, middle managers in low commitment to HDC implementation quadrants had greater local social network involvement than middle managers with high commitment to HDC implementation. Some of these middle managers indicated that many facilities even within a single health center were too independent to benefit from the participation of other facilities in the HDC. One middle manager said:

“Initially, we all started data entry the same way. But, in the end,…everybody does it, but we all do it just a little bit different because my flow is different than the flow in [another facility], which is different than the flow in [yet another facility]. So, what works here doesn’t necessarily work as well someplace else, and so we’ve all modified the way that we do it, but we each do it a little bit different.” (015)

Another middle manager remembered technical difficulties associated with having multiple facilities participating in the HDC:

“[I]t was very challenging from a computer standpoint because we live in a rural area. Every time an update would come down to PECS or whatever they were using, we would have to bring someone in from two hours away and sometimes lose data, sometimes not. It was hard to merge old data with new data in the - it was hard…and very much complicated by having multiple locations…From a computer standpoint, it was a nightmare.” (024)

Several middle managers indicated that the participation of other facilities in the HDC required too much of their time to engage in activities that would promote HDC implementation in their own facilities. One middle manager remembered:
“Sometimes they [employees at another facility] would call and say, ‘What is this depression screening thing again?’ and I’ll say, ‘If you remember, it’s the tool that I gave you. They say that with chronic illnesses, depression is a factor. That we need to evaluate these patients, make sure that that’s not a current factor in their lives.’ Then I’d send them the depression tool again.” (059)

Another middle manager described how assisting another facility with HDC-related activities limited her ability to engage in activities that would promote the HDC in her own facility:

“I put a lot of effort and energy into getting the staff [in the other facilities] on board but…I just said, ‘You know, I can’t keep doing this. I can’t keep running back and forth trying to get their people onto this’…I mean they know what they need to do, the site manager, the nurse site manager’s been the same, and so has the clinical director, so I just felt that that was frustration, a big frustration for me.” (087)

Indeed, many of the middle managers who indicated that the participation of other facilities in the HDC taxed their commitment to HDC implementation reported that the facility in which they worked had participated in the HDC for a longer period of time than other facilities in their health center. These more senior facilities may have shouldered the burden of mentoring facilities that had not participated in the HDC for as long. Conversely, middle managers whose commitment to HDC implementation increased as a result of the participation of other facilities may have benefitted from more senior facilities’ experience.

This result suggests that potential moderators of the relationship between local social network involvement and middle managers’ commitment to innovation implementation include the age of the facility and the responsibility of the facility for training other facilities in the health center (see table 6.5.2).

6.5.7. Top managers’ support

Although OLS regression analyses did not indicate a statistically significant relationship between top managers’ support for an environment that encourages HDC implementation
and middle managers’ commitment to HDC implementation, the relationship was statistically significant in bivariate analyses. The difference between OLS regression and bivariate results might be attributed to Aim 1’s small sample size or its narrow definition of middle managers’ commitment to HDC implementation. Further, as I describe in detail in Chapter 7: Discussion and Conclusion, the relationship between top managers’ support and middle managers commitment in OLS regression analyses may have been absorbed by performance reviews, which may represent a key facet of top managers’ support: regular and open communication with top managers. Indeed, the middle managers whom I interviewed reported that top managers’ support had an effect on their commitment that was unparalleled by any other IP&P. In fact, 12 of the 16 middle managers whom I interviewed identified top managers’ support as the IP&P that had the greatest influence on their commitment to HDC implementation. Specifically, middle managers reported that top managers in their health centers had the authority to define middle managers’ role in promoting HDC implementation; without support from top managers for engaging in activities to promote HDC implementation, middle managers would not have been able to commit to HDC implementation. One middle manager, for example, recalled that having top managers’ permission to engage in activities to promote HDC implementation – despite their skepticism about the HDC – increased her commitment to HDC implementation:

“That’s fine, they’re still giving us permission. That’s great. And I know they’re not happy campers, but then we have to try and see if we can work on our situation with our existing people and what we can do with it… It really didn’t matter to me as long as they gave me the permission to do it…that made me a happy camper.” (097)

Specifically, middle managers reported that supportive top managers gave them the following tools that were necessary to commit to HDC implementation: (1) means; (2) authority; (3) autonomy; (4) open communication; (5) and advocacy. Each of these variables
may mediate the relationship between top managers’ support and middle managers’
commitment to innovation implementation (see table 6.5.2). In other words, top managers’
support may have increased the means, authority, autonomy, open communication, and
advocacy to which middle managers had access; in turn, these variables increased middle
managers’ commitment to HDC implementation.

First, middle managers indicated that top managers demonstrated support by giving
middle managers the means to commit to HDC implementation. For example, one middle
manager remembered that the top managers in her health center allowed her to participate in
provider hiring decisions. Doing so ensured that new providers would be willing HDC
participants. This limited the taxing process of getting providers to buy in to the HDC in
which many other middle managers had to engage. Another middle manager remembered
that top managers in his health center his gave him the money to get training from the
National Committee for Quality Assurance (NCQA). He remembered:

“It cost us several thousand dollars, but [NCQA] came into our center, looked at our
program, and said this is where you can use our services, and they provided a day-long
education for all of our clinic in diabetes. It was just a great thing because it finally
brought [all health center employees] up to par in the same place…[I]t was a huge thing
for administration [to say], ‘This is a problem, we recognize it, and now we’re going to
support it, and you’re all going to be educated on how to take care of patients with
diabetes,’ which is something that sort of came from the collaborative.” (109)

Another middle manager indicated that simply being allowed to bill for time spent on HDC-
related activities, including travel to national and regional HDC meetings, enabled her to
commit to HDC implementation. Indeed, some middle managers’ commitment to HDC
implementation was constrained by having to use unpaid or vacation time to engage in HDC-
related activities. This suggests that top managers’ support may mediate the relationship
between access to training resources and middle managers’ commitment (see table 6.5.2); top managers granted middle managers access to training resources.

Second, middle managers reported that supportive top managers gave them the authority necessary to lead a team toward HDC implementation. Middle managers indicated that they needed the authority to call meetings, direct employees in HDC-related activities, and execute changes to clinical and administrative health center systems. One middle manager reported that top managers in her health centers went as far as incorporating the HDC into new employee orientation materials:

“Our executive director…did…an hour’s orientation with new staff, gave them the history of us as a federally qualified health center and what it means to be a federally qualified health center, and then he would go into the video on [the fact that] we’re involved in the collaborative…[The video] nicely and succinctly stated what [the HDC was] about, and so every new employee – whether it was a reception person, a maintenance person, a provider staff – everybody saw the same video.” (106)

This introduction conveyed to new employees the importance of the HDC, imbuing middle managers with the authority necessary to direct employees in HDC-related activities.

Third, middle managers indicated that supportive top managers afforded middle managers the autonomy necessary to engage in activities to promote HDC implementation in the way that middle managers deemed best. One middle manager enjoyed that “[if she] worked all day Saturday and wanted a different day off,” top managers would be understanding (024). Another middle manager said that autonomy allowed him to “do the things that [he thought] needed to be done”; he said, “I wasn’t in a position where I felt that I had to run every little change by our CEO. So…being empowered to make those changes…definitely facilitated [my] involvement [in the HDC]” (100). One middle manager reflected on how supportive top managers in her health center allowed her to excel in her role by allowing her both the autonomy that she needed to act independently and the direction
that she needed to stay focused on engaging in activities to promote HDC implementation: “I like the independence…But then I appreciate somebody saying, you know, ‘We need to do this’ or ‘We need to change this’” (141).

Fourth, middle managers indicated that open communication with top managers in their health centers gave top managers sufficient information to confidently support middle managers’ commitment to the HDC. Many middle managers who reported having supportive top managers indicated that they spoke regularly with top managers about HDC operations. This allowed middle managers to warn top managers about potential problems, troubleshoot existing problems, and share success stories with top managers. One middle manager said, “I just walk in [to talk with top managers] and say, ‘Hey, I need something’” (064). Another said, “[W]e meet weekly and hash out issues and problems and talk about wonderful things that have happened” (087). This open communication enabled top managers to be willing advocates of the HDC. As described in the Performance reviews section above, many middle managers classified this open communication with top managers as informal performance reviews; for many middle managers, performance reviews represented regular and open communication with top managers. Performance reviews may mediate the relationship between top managers’ support and middle managers’ commitment (see table 6.5.2).

Fifth, middle managers reported that top managers’ advocacy of the HDC was instrumental in their commitment to HDC implementation. Middle managers indicated that, as the ultimate authority in health centers, top managers were extremely influential in garnering the support of a health center’s stakeholders, such as patients, administrative and clinical employees, and the board of directors. One middle manager, for example, recalled
that top managers petitioned the board of directors to hire a chronic care coordinator and
patient data entry employee on her behalf. Another middle manager recalled:

“This [the executive director and the medical director would give [HDC] reports as part of
their…reporting for monthly board of director meetings. The [top managers put] out an
informational newsletter…[in which] the executive director put[s] articles of interest to
keep communication open throughout all the organizational levels, and [the HDC] had a
regular…corner in it just to do updates so that the entire staff would know [about it].”

(106)

Yet another middle manager recalled when the medical director got the providers in her
health center to buy into the HDC:

“[B]elieve me it wasn’t me getting them enthused about it because providers are
providers…[O]ur medical director [had] the time and experience to be able to be an
influence, an agent for change, and [he said to the providers], ‘Look, we can’t put this off
any longer,’ and then [it] that was agreed upon by the providers.” (106)

This suggests that top managers’ support may moderate the relationship between access to
human resources and middle managers’ commitment; that is, top managers’ advocacy may
have increased administrative and clinical employees’ engagement in HDC implementation,
thereby increasing middle managers’ commitment to HDC implementation (see table 6.5.2).

And another middle manager recalled that simply by attending an HDC patient education
event, a top manager in her health center garnered the support of many employees and
patients.

Middle managers consistently reported that top managers’ support – or lack thereof –
significantly influenced their commitment to HDC implementation. Moreover, top managers’
support had a large effect on middle managers’ commitment to HDC implementation; a small
amount of support from top managers resulted in a large increase in middle managers’
commitment to HDC implementation. One middle manager remembered that her
commitment to HDC implementation suffered when she had a miscarriage. The middle
manager was strongly considering quitting her job when top managers approached her to discuss her poor performance. The top managers had not previously been supportive of her efforts with the HDC, so the middle manager recalled being surprised when the top managers said, “We support you and we want you to overcome this” and told her to take a few days’ vacation. With those few words and that small gesture of support, the middle manager remembered, “I came back with a new attitude” (059). Another middle manager remembered that having top managers attend national and regional HDC meetings was critical in empowering her to engage in activities to promote HDC implementation:

“You had somebody in upper management, me in mid-management and then you had a line staff nurse or someone else, data entry or someone like that, attending [the meetings] so it reflected our whole staff, and they could go back to staff at all levels and encourage them and explain to them why we were going through this process and what our outcome was hopefully going to be.” (085)

Lack of support from top managers also had a significant and substantial effect on middle managers’ commitment to HDC implementation; top managers’ often seemingly innocuous or isolated failures to demonstrate support sometimes resulted in large decreases in middle managers’ commitment to HDC implementation. One middle manager, for example, felt slighted when top managers in her health center decided to hire a patient data entry employee without discussing it with her or the HDC team first; she resigned as a result. She recalled:

“They [hired the person] independently, and they told me that no matter what I felt, I was not the boss. And I said, ‘I don’t care if you guys want to do it this way, but we need to do it through the [HDC] team. We need to discuss it. I need to report it. I’m the one who has to answer to these people [HDC administrators],’ and so I said, ‘Fine,’ and I resigned.” (095)

Another middle manager remembered the frustration that she felt when top managers in her health center did not attend regional or national HDC meetings with her; without attending
the meetings, she worried, top managers would not be able to advocate for the HDC and, therefore, enable her to engage in activities to promote HDC implementation:

“Well I guess I just believed that, if here I am representing the collaborative, and this is one of my roles at the clinic, we should look at some of the things that are available, and participate in them...And I remember going to these meetings feeling frustrated that it was just...me and some support staff, and I never really had a CEO, or anyone coming, or even a quality improvement person coming to go to some of these higher level meetings. I couldn’t be everywhere...[S]o I sort of felt like we can’t really do this the best way because we don’t really have [top managers] coming here to participate.” (109)

6.5.8. Control variables identified as potential determinants of middle managers’ commitment to innovation implementation

Aim 2 analyses suggested that two variables for which Aim 1 ordinary least squares regression analyses controlled – organizational turnover and size – had implications for middle managers’ commitment to HDC implementation. Neither of these variables was statistically significant in Aim 1 analyses; however, in Aim 2 interviews, many middle managers indicated that organizational turnover and size negatively influenced their commitment to HDC implementation. Differences between Aim 1 and Aim 2 results might be attributed to Aim 1’s small sample size. Alternatively, Aim 1’s narrow definition of middle managers’ commitment to HDC implementation may have dampened the influence of organizational turnover and size: Whereas increased organizational turnover and size might not prevent a middle manager from regularly using an HDC listserv, virtual classroom, and webpage, increased organizational turnover and size may limit middle managers’ ability to change patient care delivery and administrative health care systems; greater numbers of patients and employees would require increased coordinative efforts to change these systems. Indeed, many middle managers described frustrations associated with turnover among other
health center employees, such as providers and top managers. The middle managers who identified turnover as a frequent occurrence in their health centers overwhelmingly reported that it had a negative influence on their commitment to HDC implementation. Specifically, middle managers complained that turnover required them to train and get the buy-in of new employees, limiting middle managers’ ability to engage in other activities to promote HDC implementation. In addition, middle managers reported that new employees were less likely than longstanding employees to fulfill HDC-related obligations, such as completing flow sheets that captured pertinent data, properly routing paper patient health records, and completing patient data entry. One middle manager said, “[A]ny time you have staff turnover, you always would see a little bit of a downturn in the monthly reporting on certain clinical measures” (087). Another middle manager recalled the frustrations associated with turnover:

“…and we’re trying really hard to reorient. And it just takes time, and we’ve maybe had some not-so-great hires, and so they lasted three months, and then they were let go or they decided to leave or whatever. So, you just finished a whole orientation, and you start over. And pretty soon [I have to ask a new employee,] ‘Let’s see. Didn’t I tell you this before? Oh, no. That was three nurses ago.’” (141)

This result suggests that employee buy-in may moderate the relationship between organizational turnover and middle managers’ commitment to innovation implementation (see table 6.5.2): If new employees had readily bought into the HDC, commitment to HDC implementation might not have decreased among middle managers.

Middle managers also reported that organizational size had a negative effect on their commitment to HDC implementation. My comparison of quadrants in section 6.2 above may offer support for this finding: Middle managers in the two low HDC implementation effectiveness quadrants had a greater number of unduplicated patients per year
(approximately 30,000 each) than middle managers in the two high HDC implementation effectiveness quadrants (approximately 10,000 each) \( (p=0.025) \), and as described in section 5.4.1 above, middle managers’ commitment had a positive, statistically significant relationship with community linkages implementation effectiveness. Indeed, middle managers in large health centers asserted that their ability to engage in activities to promote HDC implementation was constrained by the number of patients or providers in their health center. One middle manager, for example, said that her health center tripled in size over the last ten years, requiring her to focus on issues associated with such a large operation, such as promoting provider productivity. Another middle manager complained that the bureaucracy associated with her very large health center made the changes that she tried to implement quite difficult. She said:

“I had worked in smaller systems and privately owned systems, and so if you walked down the hall and said, ‘We’ve got a problem here,’ you could fix it in a few weeks, where[as] here it seems to take six months or nine months to evolve.” (020)

Yet another middle manager recalled feeling frustrated when hearing about the successes of middle managers in smaller health centers at regional HDC meetings:

“And I would go to statewide meetings and the people would say, ‘Well, we have 12 diabetics in our registry, and we go to their house, and pick them up, and bring them to their appointments so we can get their measures done.’ Well, we had 150 patients in our diabetic registry and anywhere between two and 2,500 depression patients in our registry, and no case manager is on site to do individual case management with those patients. So, in that sense, it was very frustrating to see other people’s measures…and ours were lower at times, and we were trying to make progress, but when you look at the patient population versus our staffing ability to manage that population, your hands are somewhat tied in what you were able to do.” (156)

This result suggests that formalization and centralization of decision-making may moderate the relationship between organizational size and middle managers’ commitment (see table 6.5.2): Formalized processes and centralized decision-making in the large health centers
decreased some middle managers’ commitment to HDC implementation. Even in large health centers, though, less formalized processes and more decentralized decision-making may dampen the negative effect of organizational size on middle managers’ commitment to HDC implementation.

6.5.9. Other variables identified as potential determinants of middle managers’ commitment to innovation implementation

Two variables that were not included in Aim 1 analyses emerged as potential determinants of middle managers’ commitment to HDC implementation in Aim 2 analyses: (1) middle managers’ values and (2) innovation effectiveness. First, many of the middle managers whom I interviewed attributed their commitment to HDC implementation to their values. These middle managers asserted that their values were immutable: They had an unwavering effect on their commitment to HDC implementation, regardless of the presence or absence of any IP&P. For example, one middle manager attributed her unwavering commitment to HDC implementation to the values instilled in her during her upbringing. She said:

“I was always an old-fashioned type person, and I was raised that if you’re going to take somebody’s money for pay, you better earn it. And they’re the ones giving you the money, so you better do what they say.” (059)

Another middle manager did not receive benefits and was not paid for time spent at national and regional HDC meetings in her first year of the HDC; however, she indicated that she continued to engage in activities that would promote HDC implementation because it was her “personality type” to do so (020). Yet another middle manager had virtually no support from top managers due to their frequent turnover in her health center. She denied that the
A tumultuous environment influenced her commitment to HDC implementation, however, because committing to HDC implementation was “part of the job description, so [it] stayed constant” (141).

Nevertheless, many of these middle managers who asserted that their values had an unwavering effect on their commitment to HDC implementation contradicted themselves, indicating that some IP&Ps influenced their commitment to HDC implementation. For example, the middle manager who attributed her unwavering commitment to HDC implementation to values instilled in her during her upbringing emphasized the importance of incentives, access to human and training resources, and top managers’ support in determining her commitment to HDC implementation. For instance, in the absence of an employee who could enter patient data, the middle manager remembered that she “didn’t have the opportunity or the time” to engage in other activities to promote HDC implementation (059). Another asserted that training gave her the confidence to “know what [she was] doing” (020). Yet another remembered that hiring additional staff to work on HDC-related tasks allowed her to “catch up” with her own HDC-related work (141).

Second, many middle managers reported that the effectiveness of the HDC influenced their commitment to HDC implementation. The goal of the HDC was to “improve the health care provided to patients and eliminate health disparities” (Texas Association of Community Health Centers, 2009). For example, an asthma HDC could be considered effective if a health center’s patients with asthma (1) received appropriate treatment with anti-inflammatory medications, (2) had an increased average number of symptom-free days in the past two weeks, and (3) had a decreased number of emergency department or urgent care visits for asthma in the past six months subsequent to HDC implementation (Texas Association of
Community Health Centers, 2009). As such, improved processes and patient outcomes signify the effectiveness of the HDC, an innovation in care for patients with chronic diseases. Several middle managers reported that seeing improved processes and patient outcomes such as these increased their commitment to HDC implementation. One middle manager, for example, said, “seeing those positive outcomes in our patients – that’s what pulled [me] through” (085). Another middle manager who was involved in a diabetes HDC remembered that seeing improved processes and patient outcomes made her commitment to HDC implementation persist despite limited access to financial resources:

“But the only reason that [I] continued…even if [I] had to stay after to do [the] work, was because we began to see changes in hemoglobin A1cs, we began to see changes in all these things, there was less medication being put out because people were getting better, they were more involved in their care, so the outcomes was what made [me] change our mind and say, ‘…[I’m] not going to let it go because we see that there’s something here that we have hit that we have to continue to go with.’” (097)

This result suggests that innovation effectiveness may moderate the relationship between IP&Ps and middle managers’ commitment to innovation implementation (see table 6.5.2): In health centers in which the HDC was effective, IP&Ps did not have as strong an effect on middle managers’ commitment to HDC implementation as they did among middle managers in health centers in which the HDC was not effective; middle managers in health centers in which an innovation is not effective may rely more strongly on IP&Ps to increase their commitment to innovation implementation.

Middle managers suggested that improved processes and patient outcomes also indirectly increased their commitment to HDC implementation by increasing access to human resources and top managers’ support. For example, one middle manager noted that support for the HDC among top managers in her health center increased when processes and patient outcomes improved. In turn, top managers’ support increased middle managers’ commitment
“[U]pper management [has] our patients’ interests at heart first, but in order to probably receive additional funding or grants, they saw the importance of having good outcomes…They want to see positive results so that they can report that to our board to show that we’re successful…[The] recognition from the health administration and the medical director that what we were doing was having a positive impact on the patients…was…a motivation for me to continue.” (085)

This middle manager also noted that improved processes and patient outcomes also “sold” providers on the HDC. As a result, the providers were more willing to engage in the HDC; providers’ willingness to engage in the HDC relieved the middle manager of the taxing process of soliciting their support. This result suggests that access to human resources and top managers’ support may mediate the relationship between innovation effectiveness and middle managers’ commitment to innovation implementation (see table 6.5.2): As HDC effectiveness increased, buy-in among top managers and other health center employees increased; in turn, this increased access to human resources and top managers’ support increased middle managers’ commitment to HDC implementation.

6.6. Moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation

The theory of perceived organizational support suggests that moderators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations may include (1) whether IP&Ps are under top managers’ control and (2) whether middle managers perceive top managers to be agents of the organization (figure 3). Aim 2 results provide little support for the theory that the degree to which IP&Ps influence middle managers’ commitment to innovation implementation depends upon whether IP&Ps are under top managers’ control and no support for the theory
that the relationship depends upon whether middle managers perceive top managers to be agents of the organization.

6.6.1. Whether IP&Ps are under top managers’ control

The theory of perceived organizational support posits that IP&Ps are more highly valued if they are offered based on discretionary choice rather than circumstances beyond top managers’ control (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002). For example, if an organization is obligated by law to provide the IP&Ps, then middle managers may not feel that the favorable treatment is as worthy of reciprocation than if IP&Ps were offered based on top managers’ discretion. I found little evidence to suggest that the strength of the relationship between IP&Ps and middle managers’ commitment to HDC implementation depended upon whether IP&Ps were under top managers’ control: Aim 2 results suggest that middle managers were largely indifferent to whether or not IP&Ps were under top managers’ control. One middle manager said, “[The top managers’ motivation] didn’t matter to me as long as they gave me the permission to do it [gain access to IP&Ps]” (097). In fact, most middle managers suggested that a top manager’s failure to provide an IP&P was usually beyond the top manager’s control. Furthermore, many middle managers sympathized with top managers when IP&Ps were scarce. Two middle managers had very similar responses when their top managers denied their requests for increased access to financial resources. One said, “[I]f we don't have the money, we don't have the money” (064). The other said, “I guess I figured that if they didn’t have it in the budget, they didn’t have it in the budget” (141).
There were two exceptions to my finding that middle managers were indifferent to whether or not IP&Ps were under top managers’ control: First, middle managers often reported feeling exasperated that top managers withheld IP&Ps until the Bureau of Primary Health Care (BPHC) required HDC participation for all federally qualified health centers. One middle manager recalled asking top managers in her organization to hire nurses and patient data entry employees for several months. Only when BPHC required HDC participation did top managers fulfill her request. She recalled:

“It took about six, nine months before I could get the third [employee] on, and then suddenly, of course, Bureau of Primary Health Care announced, ‘Yes, the collaboratives will be part of their evaluation tool of all CHCs,’ and then everybody else came onboard all at once.” (059)

Another employee remembered that top managers in her health center were unsupportive of her efforts to solicit supplementary funding for the HDC until the HDC became a BPHC requirement. When top managers realized that HDC participation could assist the health center in acquiring grant funding, they were more forthcoming with IP&Ps. This finding was not consistent across quadrants, however; top managers associated with middle managers in the high commitment to HDC implementation/high HDC implementation effectiveness quadrant reportedly gave middle managers greater access to human resources than top managers in other quadrants. This finding offers support for the Aim 2 finding that top managers’ support and access to human resources influenced middle managers’ commitment to HDC implementation. This also suggests that access to human resources may mediate the relationship between top managers’ support and middle managers’ commitment to innovation implementation (see table 6.5.2): Top managers’ support often increased middle managers’ commitment to HDC implementation by giving middle managers access to human resources.
The second exception to my finding that the relationship between IP&Ps and middle managers’ commitment to HDC implementation depended upon whether IP&Ps were under top managers’ control was that middle managers reported that performance reviews had a stronger effect on their commitment to HDC implementation when top managers willfully conducted performance reviews; according to the middle managers whom I interviewed, performance reviews had no effect on their commitment to HDC implementation when an organizational mandate obligated top managers to conduct the performance reviews (see table 6.5.2). As discussed in section 6.5 above, several middle managers indicated that informal feedback was more valuable than formal performance reviews. Most middle managers reported that formal performance reviews were inconsistent, contrived, and poorly administered. In contrast, many middle managers reported that informal feedback increased their commitment to HDC implementation. These middle managers explained that informal feedback allowed them to resolve issues before they became problematic enough to report during formal performance reviews. As I discuss in detail in Chapter 7: Discussion and Conclusion, informal feedback during regular and open communication about middle managers’ HDC-related performance represents a key facet of top managers’ support.

6.6.2. Whether middle managers perceive top managers to be agents of the organization

The theory of perceived organizational support posits that IP&Ps are more highly valued if employees identify top managers as agents of a benevolent organization as opposed to idiosyncratic actors. Aim 2 results provide no support for this theory. The middle managers whom I interviewed consistently described top managers in terms of top managers’ individual attributes – never as agents of their health centers. For example, one middle
manager remembered her relief when a new team of top managers replaced an old team of unsupportive top managers. She described the takeover in terms of the benefit to employees who worked in her health center; they would continue to work in her health center under the new team of top managers. She did not suggest that the health center as she knew it disintegrated when the old team of top managers left the health center. She recalled:

“[I]Immediately [the new team of top managers] had a meeting with us, and they said, ‘This is our company. It is not my company. This is our company. We will either make this company or we will make it fall. But our goal is to make it rise.’ And they’ve had no secrets. They have got us completely out of our bottom of the barrel financial situation.” (059)

Another middle manager remembered that a new top manager struggled to prove his professional competence in her health center. Indeed, the middle manager did not take for granted that the new top manager was an agent of her health center; instead, she viewed him as an individual who had to fight for his position in her health center. Furthermore, none of the middle managers whom I interviewed attributed their attachment to their health center to top managers.

**6.7. Mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation**

Potential mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations include (1) job involvement (identification with and interest in the specific work one performs), (2) job-related affect (job satisfaction and general mood), and (3) strain (aversive psychological and psychosomatic reactions) (Rhoades & Eisenberger, 2002) (figure 3).
6.7.1. Job involvement

The theory of perceived organizational support suggests that middle managers may experience increased commitment to innovation implementation because IP&Ps increase their job involvement (identification and interest in innovation implementation). For example, a middle manager who receives incentives for implementing an innovation may find that he or she is more involved in innovation implementation than a middle manager who does not receive incentives for implementing the innovation. Aim 2 results provided substantial support for the theory that middle managers experienced increased commitment to HDC implementation because some IP&Ps increased their involvement in HDC implementation. Although I found no evidence to suggest that access to financial resources increased middle managers’ involvement in HDC implementation, the middle managers whom I interviewed indicated that other IP&Ps (incentives; performance reviews; access to human and training resources; local social network involvement; and top managers’ support) increased their involvement in HDC implementation (see table 6.5.2).

Incentives

One middle manager whom I interviewed indicated that incentives increased her involvement in HDC implementation: She said that the public recognition that she received for her commitment to HDC implementation made her “feel better” about what she was doing and made her “get in there and be even more involved in trying to come up with even more ideas or ways of helping patients to improve” (085).

Performance reviews
According to the middle managers whom I interviewed, performance reviews increased their involvement in HDC implementation by providing them with feedback and encouragement to persist in their commitment to HDC implementation. One middle manager, for example, said that performance reviews gave her the feedback that she needed to continue engaging in activities to promote HDC implementation. She said:

“I always saw the value in doing the data collection and getting that report cycled out, but to really stay tuned into rapid cycle improvement and to keep those narratives going, I needed that feedback.” (020)

Another middle manager indicated that performance reviews reinvigorated her desire to be involved in HDC implementation. She said, “[B]ecause [my supervisor] thinks I’m doing a good job with this…I want to continue to do a good job” (064).

Access to human resources

The middle managers whom I interviewed indicated that access to human resources increased their involvement in HDC implementation in two ways. First, access to human resources allowed middle managers to engage in HDC-related activities that were the most interesting to them. For example, one middle manager said that being able to hire a patient data entry employee allowed her to “go back into the role [she] needed to be in” (059). She explained:

“When I was just doing the data input, that’s one of our nosedives, we had several nosedives on our rollercoaster because all I could do was do part of my job, part of my job, part of my job, and get these in, and it was very chaotic, very cut and chopped up” (059)

Second, access to human resources afforded middle managers the camaraderie that kept them involved in HDC implementation. One middle manager said about the HDC team:

“It wasn’t just a team that met once a week but everyone was involved, everyone had
responsibility and yeah, it was one thing that brought the staff together and everyone was involved...” (085)

Another middle manager said about the HDC team at her health center, “[W]hat we…inspired in one another was that we really had a sense of purpose, we had a real sense of pride in the type of work that we provided to our patients” (186).

**Access to training resources**

Aim 2 results suggest that, of all IP&Ps that I studied, access to training resources had the strongest influence on middle managers’ involvement in HDC implementation. Attending regional and national HDC meetings gave middle managers perspective and practical tools for success with the HDC. In turn, the perspective and tools helped middle managers identify with and develop an interest in HDC implementation. One middle manager said that a national HDC meeting gave her “a vision” for what she could do to promote HDC implementation (100). Another middle manager remembered that ideas about what she could do to promote HDC implementation that she got at a national HDC meeting helped her to identify more with her role in the HDC. Yet another middle manager remembered that she initially felt removed from the HDC and, therefore, had little interest in promoting its implementation in her health center. Attending national HDC meetings, however, increased her interest in the HDC by making her feel like she was part of the “larger picture” (156).

**Local social network involvement**

One middle manager whom I interviewed indicated that local social network involvement increased her involvement in HDC implementation. Specifically, she said about the participation of the other facility in her health center:
“If they had not done it, I would have felt like we weren’t being basically the big team so the fact that they were as interested and engaged as the primary care providers down here definitely influenced my enthusiasm about the program” (106)

Top managers’ support

The middle managers whom I interviewed suggested that top managers’ support enabled middle managers’ involvement in HDC implementation. For example, one middle manager recalled that her involvement in HDC implementation increased when an unsupportive top manager was replaced by a supportive top manager. Another middle manager remembered that a top manager gave her the information necessary to become involved in HDC implementation: “Our executive director is really great. I mean, she believes in the collaborative, and she, with her talking about it and showing me this stuff, she made me a believer in it” (064).

6.7.2. Job-related affect

The theory of perceived organizational support also suggests that the increased commitment to innovation implementation resulting from IP&Ps might also be due, in part, to job-related affect (job satisfaction and positive mood). For example, middle managers who have access to training resources may feel more competent, enhancing their job-related affect. In this study, middle managers’ job of interest was implementing the HDC. Although I found no evidence to suggest that incentives or performance reviews influenced middle managers’ HDC implementation-related affect, Aim 2 results provided some support for the theory that other IP&Ps influenced middle managers’ HDC implementation-related affect (see table 6.5.2).
Access to financial resources

Only one middle manager whom I interviewed reported that access to financial resources improved their HDC implementation-related affect. She said that getting lab equipment that allowed employees in her health center to conduct hemoglobin A1C testing on-site improved her mood:

“I think it was exciting to get the instrument, just to be able to have that extra tool to watch the lab results, and they have them immediately as opposed to having to wait and then who knows who looks at them.” (061)

Access to human resources

Several middle managers whom I interviewed reported that access to human resources influenced their HDC implementation-related affect. A middle manager reported that working with providers who were actively engaged in the HDC improved her satisfaction with her role in implementing the HDC. She said:

“Yeah, to be a part of the team, where it was nice not having to drag providers on the team, like we want you to be involved, that there are people that stepped out, so they want that involvement. So when you have that, yeah, it does make you have a higher job satisfaction.” (156)

Many more middle managers, on the other hand, discussed how lack of access to human resources decreased their HDC implementation-related affect. In particular, middle managers reported that they and other employees in their health centers were overworked. One middle manager reported that this decreased her HDC implementation-related affect:

“[T]here were times when I thought -- I’m like, I need another job…Well it was just the labor intensity. We were having some issues with who was going to be doing the data entry. Well obviously it couldn’t be me, and at times it had to be me because we had some trouble getting some part time help into that role…But I think it was frustration with feeling like there was a lot of work involved and there was nobody to help with it.”
Another middle manager reported that she left her position because she became burnt out as a result of lack of access to human resources. She remembered:

“I was a director of three clinics, and then on top of that, running this pretty good sized program... I really had a lot... The coordinator later left for another position near the end, so it all kind of came back to me again, too... So, if things had been divvied up a little bit differently, either from my directorship clinic stuff, or cut back in that way. I mean I think I’d probably still be there today.” (186)

**Access to training resources**

Several middle managers reported that access to training resources influenced their HDC implementation-related affect. Some reported that attending national and HDC meetings left them feeling energized and optimistic about their ability to promote HDC implementation in their health centers. One middle manager remembered:

“I enjoyed the ideas that [HDC meetings] brought to my mind, and getting to know the other community health centers in my area, and sharing resources. I did a bunch of brainstorming with other FQHC that have... Latino populations. How do you work with interpreters? How do you do your group business? So I think it was very motivating to see what people were doing out there, and to sort of compare yourself. Okay, how are we doing, and how can we do better, and what are the resources out there?” (109)

One middle manager, however, reported that one HDC meeting left her and employees in her health center “depressed” and “frustrated” (095). She recalled:

“I went to one meeting where they talked about before PECS ever came in...[T]hey hired this... speaker to come in to talk about IT, and he said, ‘Well whatever you’re currently doing is not going to work.’ There were tears because of all the time and effort that these people made in trying to put this data into a computer. Well none of us were using the same program...[I]t made everybody horribly depressed, frustrated, etcetera, etcetera, etcetera. All the time and effort and work we did and to hire someone to come up and tell you whatever you’re doing it it’s not going to work.” (095)

**Local social network involvement**
Two middle managers indicated that local social network involvement influenced their HDC implementation-related affect. One middle manager said that the “collegial working relationship” that local social network involvement afforded her improved her HDC implementation-related affect (106). In contrast, the other middle manager said that the competition inherent in local social network involvement decreased her HDC implementation-related affect. She said:

“I guess sometimes it was great to hear if their numbers were going down or their referral numbers were going up, but then again, sometimes it was I wish I had the time to do what [they were] doing to make my numbers do that one way or another.” (061)

*Top managers’ support*

Several middle managers – particularly those in the low commitment to HDC implementation/low HDC implementation effectiveness quadrant – reported that top managers’ support influenced their HDC implementation-related affect. Two middle managers indicated that the turnover of unsupportive top managers and hiring of supportive top managers greatly improved their job-related affect. One said:

“I’m sure it improved my enthusiasm because once we got into working with it and it was clear that the medical director was telling the docs this [HDC implementation] will happen…we were just able to roll...” (106)

Several middle managers discussed their disappointment when top managers were unsupportive. One middle manager lamented that top managers in her health centers did not accompany her to HDC meetings:

“But the biggest time when it really affected me was when we all had to go to the collaborative events, we were required to go to these events, and the other CHCs in [my state] would go, and their [top managers] would be there with them…and then there I was with no [top managers]. Those events [are] what made me the most disheartened.” (059)

The particularly strong relationship between top managers’ support and HDC
implementation-related affect among middle managers in the low commitment to HDC implementation/low HDC implementation effectiveness quadrant may be due to a generally heightened sensitivity to critical IP&Ps such as top managers’ support; these middle managers may have had fragile circumstances that limited their ability to cope with limited support from top managers.

6.7.3. Strains

Finally, the theory of perceived organizational support suggests that middle managers may experience increased commitment to innovation implementation as a result of IP&Ps because IP&Ps decrease strains (aversive psychological and psychosomatic reactions to innovation implementation). Having access to human resources, for example, may give middle managers the ability to commit to HDC implementation by ameliorating some of the strains associated with HDC implementation, giving them the opportunity to engage in activities that demonstrate commitment to HDC implementation. Aim 2 results offered no evidence to suggest that incentives or access to financial resources influenced strains. Aim 2 results offered some support, however, for the theory that other IP&Ps influenced strains (see table 6.5.2).

Performance reviews

Only one middle manager reported that performance reviews influenced strains. After several years without undergoing performance review, the middle manager received a poor rating in her performance review. The unprecedented poor rating was stressful to the middle manager. She said:

“First of all, I don’t even get [a performance review] on a yearly basis. I don’t even
know from one year to five years from now what’s happening, and then all the sudden I get a low evaluation? Why?” (097)

Access to human resources

A few middle managers indicated that access to human resources decreased strains. Each of these middle managers reported that hiring an employee to assist with HDC implementation decreased their burden associated with committing to HDC implementation. For example, one middle manager remembered that hiring a patient data entry employee allowed her to more effectively commit to HDC implementation:

“[Hiring the employee] helped a lot because…it was overwhelming trying to do the majority of it by myself, and then when the additional staff was hired on, I felt that I was not on my own. I felt that we just would have the ability to do more. It was shared responsibility, so that took a lot off of my mind and…being able to have someone else help out with the duties, the audits, different things like that made my job a lot easier.” (085)

Access to training resources

Three middle managers indicated that access to training resources increased strains. Two of these middle managers indicated that undergoing training was often overwhelming. One of them remembered the first national HDC meeting:

“[I]t was overwhelming. That first training was too much. I think they [HDC administrators] learned from that, because I don’t believe they did another great big one like that. That was huge. That was a huge, too many people, too much learn at the beginning...” (059)

Another middle manager recalled that traveling to HDC meetings was stressful because it took time away from her other HDC duties and her child:

“[S]ometimes it was stressful to travel and be gone for two or three days to conferences or whatever leaving behind additional duties that had to wait until you’d returned…I’d dread to get on an airplane and have to be gone…with the guilt of leaving [my child].” (085)
Local social network involvement

Only one middle manager reported that local social network involvement influenced strains. Sharing her workload with the team leader in another facility, the middle manager indicated, relieved stress. She said:

“[The participation of the other facility in the HDC] definitely primarily and predominantly alleviated stress because of shared workload, and so neither [the middle manager in the other facility] was crushed nor I, so it relieved stress. Occasionally she would get behind, and I would certainly get behind…[W]e both could get kind of behind in data entry, so we would help each other out, and…that’s a big stress reducer. You just don’t feel like you’re in it alone.” (106)

Top managers’ support

Just one middle manager reported that top managers’ support influenced strains. Specifically, the middle manager recalled that a top manager diffused tense interactions with employees in other facilities in her health center; the employees in the other facilities felt that employees in the middle manager’s facility received special treatment as a result of participating in the HDC. She remembered:

“[W]hen we’d get into these situations where…you get seven [facilities] together, and they’d be going, [W]ell why is [that facility] sitting where they’re sitting, and we’re sitting where we’re sitting?”, he was the one that would say, ‘Well it is because of what they do with the collaborative, and they’re engaging in these sorts of things, and that’s why we want them to train you to do these sorts of things and that sort of thing.’ So yeah, he was definitely…the de-stressor when you got into those situations.” (020)

6.8. Summary

6.8.1. Insights into Aim 1 findings

Aim 2 results generally supported Aim 1 findings, suggesting the following: (1) middle managers engaged in important activities that promoted HDC implementation in health
centers and (2) middle managers relied on IP&Ps to foster their commitment to HDC implementation. To some extent, however, Aim 2 results conflicted with Aim 1 results related to which IP&Ps fostered their commitment to HDC implementation: Whereas Aim 1 results indicate that middle managers’ commitment had positive, statistically significant relationships with performance reviews and top managers’ support, the middle managers whom I interviewed in Aim 2 reported that top managers’ support had an effect on their commitment that was unparalleled by any other IP&P; middle managers were far less emphatic about the role of performance reviews in influencing their commitment.

In addition to enhancing Aim 1 analyses, Aim 2 analyses revealed many potential moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation (see table 6.5.2) and other potentially important determinants of middle managers’ commitment to innovation implementation, including the following: (1) organizational turnover; (2) organizational size; (3) values; and (4) innovation effectiveness. These findings rarely varied based upon quadrant.

6.8.2. Moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation

Moderators

Aim 2 results provided little support for the theory that the degree to which IP&Ps influence middle managers’ commitment to innovation implementation depends upon whether IP&Ps are under top managers’ control; middle managers were largely indifferent to whether or not IP&Ps were under top managers’ control. Aim 2 results provided no support for the theory that the relationship depends upon whether middle managers perceive top
managers to be agents of the organization. Again, these findings rarely varied based upon quadrant.

*Mediators*

Aim 2 results provided mixed support for proposed mediators of the relationship between IP&Ps and middle managers’ commitment to HDC implementation. Aim 2 results provided substantial support for the theory that middle managers experience increased commitment to HDC implementation because some IP&Ps increased their involvement in HDC implementation; however, Aim 2 results offered only moderate support for the theory that job-related affect or strains mediate the relationship between IP&Ps and middle managers’ commitment to innovation implementation. As with other Aim 2 findings, these findings rarely varied based upon quadrant.
CHAPTER 7
DISCUSSION AND CONCLUSION

7.1. Overview

This chapter highlights key findings from Chapters 5 and 6 based on the study’s aims:

Aim 1: To assess the relationships among implementation policies and practices (IP&Ps), middle managers’ commitment to innovation implementation, and implementation effectiveness in health care organizations.

Aim 2: To enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations.

The study used a mixed method sequential design to triangulate results and minimize mono-method bias (Cook & Campbell, 1979; Tashakkori & Teddlie, 1998), and to elaborate on survey findings using illustrations from interviews with middle managers (Greene et al., 1989). I mixed data types because neither quantitative nor qualitative data alone are sufficient to capture the complexities of innovation implementation. When combined, quantitative and
qualitative data offer a more nuanced understanding of innovation implementation (Tashakkori & Teddlie, 1998). Since the study aims are complementary, I integrate quantitative and qualitative results to interpret and explain key findings from Aims 1 and 2 below (see figure 4.1).

This chapter also answers the study’s overarching research question: What is middle managers’ role in innovation implementation in health care organizations? In so doing, it identifies high-leverage ways for health care organizations to facilitate the translation of evidence into practice.

7.2. Chapter outline

In section 7.3.1 below, I summarize key study findings. Specifically, I discuss my findings regarding relationships between (1) middle managers’ commitment and implementation effectiveness (2) IP&Ps and middle managers’ commitment. In my discussion of the relationship between IP&Ps and middle managers’ commitment, I demonstrate that middle managers’ commitment can be leveraged to increase implementation effectiveness in health care organizations. I also discuss how an infrastructure that supports innovation implementation is critical for leveraging middle managers’ commitment. In section 7.3.2, I discuss study limitations.

In section 7.4, I discuss implications for theory and practice and directions for future research. Section 7.5 contains concluding remarks.

7.3. Summary of findings and study limitations

7.3.1. Summary of findings
Introduction

Results indicate that commitment to innovation implementation among middle managers has the potential to improve implementation effectiveness in health care organizations. Middle managers’ commitment cannot be taken for granted, however; my results indicate that middle managers’ commitment must be fostered. In particular, middle managers’ commitment can be fostered with an infrastructure that supports innovation implementation. Top managers are in a key position to promote such an infrastructure. Specifically, I found that many middle managers perceived IP&Ps in their health centers to be lacking; top managers can modify this perception in three ways: First, top managers can make it known that innovation implementation is a priority in the organization. Second, top managers can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance. Third, top managers can remain attuned to the ways in which IP&Ps may increase middle managers’ commitment. That is, it is not enough simply to grant access to the IP&Ps; top managers must ensure that the IP&Ps have their intended effect (e.g., access to human resources alleviates strains among middle managers) and that no barriers exist that may limit the positive influence of IP&Ps on middle managers’ commitment (e.g., resistance to innovation implementation among providers does not increase strains among middle managers).

Middle managers’ commitment: A lever for improving implementation effectiveness in health care organizations

Results indicate that commitment to innovation implementation among middle managers has the potential to improve implementation effectiveness in health care organizations.
Implementation effectiveness remains suboptimal in health care organizations; however, middle managers’ commitment has a positive relationship with implementation effectiveness, and middle managers are not consistently committed to innovation implementation. Taken together, these results suggest that increasing middle managers’ commitment to innovation implementation offers health care organizations an opportunity to improve implementation effectiveness. I elaborate on each of these results below.

Study results indicate that the implementation of the HDC, an innovation in health care, was suboptimal. This finding is consistent with previous studies’ findings of suboptimal innovation implementation in health care organizations (Burstin et al., 1999; Li et al., 2004; McGlynn et al., 2003). As many as five years after initiating the HDC, few health centers had effectively implemented the innovation. In a systematic review of the literature of empirical research on quality improvement implementation in health care organizations, Alexander (2008) identified several barriers to innovation implementation such as structure, workload, reimbursement, feedback, leadership, information accessibility and awareness. Only one of the 92 studies included in the review (Bostrom, Wallin, & Nordstrom, 2007) considered the influence of middle managers on implementation effectiveness: The study found that middle managers’ support of employees participating in implementation was one of several predictors of implementation effectiveness. In contrast, my study specifically focuses on the role of middle managers in innovation implementation.

Indeed, I found in Aim 1 analyses that middle managers’ commitment to innovation implementation is positively related to one indicator of implementation effectiveness. Aim 2 analyses bear out this finding: Middle managers engaged in a variety of activities to promote innovation implementation. For example, they developed and maintained patient data
registries, changed health center systems, solicited funding, engaged in emotional work, and used online tools to promote HDC implementation effectiveness. These findings echo studies in industries other than health care that have found that middle managers influence implementation effectiveness by (1) mediating between strategy and day-to-day activities; (2) “selling issues” such as innovation implementation to frontline employees; and (3) creating knowledge through social networks. I discuss these findings in detail below.

Maintaining patient data registries, changing health center systems, and soliciting funding each represent middle managers’ efforts to mediate between the strategy of participating in the HDC and the day-to-day activities associated with implementing the HDC (Uyterhoeven, 1972). For example, participating in the HDC required health centers to develop and maintain a registry of data for patients with the chronic disease of interest (e.g., diabetes). Middle managers were charged with overseeing the collection of these patients’ baseline data, generating reports for submission to national HDC employees, and troubleshooting registry software. Translating strategy into day-to-day activities required middle managers’ unique access to information regarding strategy and knowledge of frontline operations (Nonaka, 1994). In part, this involved redirecting frontline employees’ attention to patient data collection and reminding them of the benefits of data collection (Kanter, 1982). For example, some middle managers struggled to get medical assistants to place the new patient flow sheets in patient health records for providers’ use, and many faced resistance from providers to using the new flow sheets that were used to collect patient data. Middle managers used their intricate knowledge of frontline operations to promote compliance among medical assistants and providers by, for example, changing the placement of the flow
sheet on health records and reassigning data entry responsibilities to whomever received a health record after a patient visit.

The emotional work in which middle managers engaged represents their effort to “sell issues” such as innovation implementation to frontline employees (Dutton & Ashford, 1993). As found in previous studies (Mantere, 2005; Ogbonna & Wilkinson, 2003; Rouleau, 2005), middle managers considered central to their role encouraging frontline employees to embrace the innovation. Middle managers encouraged and sometimes confronted providers who felt that the Bureau of Primary Health Care, top managers, or middle managers used the HDC to dictate how they should practice medicine. Middle managers did so through daily conversations and more subversive tactics such as allowing improved patient outcomes subsequent to the HDC to convince resistant providers of the HDC’s benefits. Middle managers also coerced top managers to embrace the HDC, either by directly confronting them or waiting until institutional pressures required health centers to implement the quality improvement methods espoused in the HDC. For example, one middle manager invited a resistant chief financial and operating officer to a national HDC meeting. At the meeting, the officer learned that he could not simply take for granted that providers in their health center provided high quality care; implementing the HDC would be necessary to ensure high quality care. Indeed, middle managers’ efforts to coerce top managers to embrace the HDC often increased top managers’ support for HDC implementation; in turn, top managers’ support bolstered middle managers’ commitment to HDC implementation.

The use of online tools represented middle managers’ effort to (1) create knowledge through social networks (Huy, 2001) and (2) synthesize information for frontline employees (Nonaka, 1994). Several middle managers explained that using these online HDC tools
represented their effort to enable health center employees to implement the HDC as effectively as possible. An HDC listserv, for instance, offered middle managers the opportunity to post questions to middle managers in other health centers regarding HDC implementation, share success stories regarding approaches to the HDC that worked in their health centers, and offer suggestions to other middle managers regarding how they might solve HDC implementation-related problems; middle managers’ generalist problem-solving skills give them the flexibility and adaptability required to translate broad strategy into concrete tasks for implementation (Dopson & Stewart, 1990). Barlett and Ghoshal (1993) suggested that this flexibility and adaptability allows middle managers to serve as horizontal links, helping to diffuse information throughout an organization. Indeed, middle managers relayed information that they obtained from online HDC tools to frontline employees in their health centers to promote implementation.

Many middle managers engaged in a variety of activities to promote HDC implementation; however, I found that middle managers were not consistently committed to HDC implementation. Specifically, commitment to innovation implementation, on average, was moderate, but less than 12 percent of middle managers “agreed” or “strongly agreed” that they regularly engaged in HDC implementation activities, whereas more than a third of middle managers “disagreed” or “strongly disagreed” that they regularly engaged in HDC implementation activities. This suggests that middle managers’ commitment cannot be taken for granted; it must be fostered. Whereas previous studies have regarded middle managers as passive recipients of strategy and taken for granted their commitment to innovation implementation (Currie & Proctor, 2005; Floyd & Wooldridge, 1997; A. W. King & Zeithaml, 2001), my results reveal middle managers’ active role in innovation
implementation. Combined with the finding that middle managers’ commitment to innovation implementation has a positive relationship with implementation effectiveness, variation in middle managers’ commitment to innovation implementation represents an opportunity to improve implementation effectiveness in health care organizations by empowering middle managers to engage in activities that promote implementation effectiveness.

**Summary**

HDC implementation was suboptimal. Nevertheless, middle managers’ commitment to innovation implementation is positively related to implementation effectiveness. Inconsistent commitment to innovation implementation among middle managers, then, represents an opportunity to increase the effectiveness of innovation implementation in health care organizations. For example, empowering middle managers to mediate between strategy and day-to-day activities, sell issues to frontline employees, and create knowledge through social networks has the potential to increase HDC implementation effectiveness. As I describe in detail below, I found that top managers are in a key position to foster middle managers’ commitment to innovation implementation: They can create an infrastructure in which innovation implementation is viewed as an organizational priority; communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance; and remain attuned to the way in which IP&Ps increase middle managers’ commitment to innovation implementation. These represent opportunities for top managers to foster middle managers’ commitment to innovation implementation and,
consequently, improve implementation effectiveness in their health care organizations. I discuss each of these opportunities in the following section.

*Developing an infrastructure to foster middle managers’ commitment*

Study results indicate that middle managers were not consistently committed to HDC implementation. This suggests that middle managers’ commitment should not be taken for granted; it must be fostered. I found that suboptimal commitment to innovation implementation among middle managers in my study did not result from apathy or resistance, as other authors have suggested (Floyd & Wooldridge, 1992); suboptimal commitment among the middle managers in my study often resulted from their perception that access to IP&Ps in their health centers was lacking.

An infrastructure that supports innovation implementation can help to modify middle managers’ perception that access to IP&Ps is lacking. Top managers are in a key position to promote such an infrastructure. Aim 1 and Aim 2 results conflicted in their findings regarding top managers’ role in contributing to an infrastructure that supports innovation implementation: Top managers’ support was not statistically significant in Aim 1’s OLS regression analyses, and it was the IP&P that middle managers discussed most frequently and emphatically in relation to their commitment to HDC implementation during Aim 2’s interviews (see table 6.5.1). For example, during Aim 2 interviews, many middle managers reported that access to human resources increased their commitment to HDC implementation, but top managers frequently refused to allow middle managers to hire necessary human resources or to grant middle managers the authority required to reallocate existing human resources’ time toward HDC implementation; as a result, middle managers’ commitment to
HDC implementation decreased. In fact, 12 of the 16 middle managers whom I interviewed identified top managers’ support as the IP&P that had the greatest influence on their commitment to HDC implementation. On the other hand, performance reviews were the least frequently discussed IP&P during Aim 2’s interviews (see table 6.5.1), but they were the only IP&P that had a statistically significant relationship with middle managers’ commitment in Aim 1’s OLS regression analyses.

Aim 1 and Aim 2 results may have diverged for three reasons: First, middle managers may have confounded performance reviews with top managers’ support during Aim 2’s interviews. That is, the middle managers whom I interviewed may have infrequently discussed performance reviews because they implicitly conceived of performance reviews as simply a key facet of top managers’ support: regular and open communication with top managers about their HDC-related performance.

Second, Aim 1’s small sample size may have limited the statistical significance of the relationship between top managers’ support and middle managers’ commitment in OLS regression analyses. Indeed, Aim 2 results suggest that performance reviews may have absorbed the effect of top managers’ support on middle managers’ commitment because it represents regular and open communication with top managers about their HDC-related performance, an important aspect of top managers’ support for an environment that encourages HDC implementation. Middle managers may have interpreted performance reviews in Aim 1’s survey not as formal annual performance reviews but rather as open, regular, and informal communication in specific terms about their implementation-related performance with top managers. Such an interpretation would support the theory that performance reviews absorbed the effect of top managers’ support on middle managers’
commitment in Aim 1’s OLS regression analyses.

Third, from the perspective of some theorists, Aim 1 and Aim 2 subscribe to distinct epistemological paradigms. On the one hand, these theorists would assert, Aim 1 takes a realist approach: It is nomothetic in the sense that it seeks to generalize findings regarding causal relationships from one phenomenon (the implementation of the HDC in community health centers) to a broader context (the implementation of innovations in health care organizations). On the other hand, they would assert, Aim 2 takes a social constructivist approach: The intensive research design allows interview participants to interpret their own experiences; from a realist’s perspective, their experiences are idiosyncratic, and researchers should not generalize findings to a broader context (Tsoukas, 1989). These theorists might assert that Aim 1 and Aim 2 results diverged because their research designs are epistemologically incompatible. Nevertheless, my goal in mixing quantitative and qualitative data types was to triangulate results and minimize mono-method bias (Cook & Campbell, 1979; Tashakkori & Teddlie, 1998), and to elaborate on survey findings using illustrations from interviews with middle managers (Greene et al., 1989). Triangulation suggests that I sought convergence, corroboration, or correspondence of results (Greene et al., 1989); I sought to understand middle managers’ role in innovation implementation in health care organizations using two data sources: a survey and semi-structured interviews. Elaborating on survey findings using illustrations from interviews with middle managers suggests that the data are complementary (Greene et al., 1989). Complementarity does not suggest that the data sources are equivalent or even similar; they each exhibit characteristics that contribute a nuanced understanding of innovation implementation when combined (Tashakkori & Teddlie, 1998).
Despite their differences, taken together, Aim 1 and Aim 2 results have important implications for how health care organizations can increase middle managers’ commitment to innovation implementation and, as a result, improve implementation effectiveness. In particular, my results suggest three opportunities for top managers to promote an infrastructure that supports innovation implementation: First, top managers can make it known that innovation implementation is a priority in the organization. Second, top managers can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance. Third, top managers can remain attuned to the ways in which IP&Ps may increase middle managers’ commitment. I discuss each of these opportunities below in turn.

*Top managers can make it known that innovation implementation is an organizational priority.* Study results provided support for the theory of perceived organizational support: Middle managers viewed IP&Ps as a sign that their health centers cared about HDC implementation; middle managers whose health centers offered IP&Ps increased their commitment to HDC implementation in support of their health center’s position. Indeed, the middle managers whom I interviewed described a sense of obligation to health centers that had provided them with IP&Ps. Nevertheless, many of the middle managers whom I interviewed believed that access to IP&Ps in their health centers was lacking. Indeed, Aim 1 results indicate that access to IP&Ps was moderate-to-poor.

Aim 2 results suggested that top managers may have an important role in instilling in middle managers the belief that they are supported in innovation implementation. Top managers can manage middle managers’ perceptions that IP&Ps are lacking in two ways: First, top managers can grant middle managers access to IP&Ps that middle managers
consider to be important for innovation implementation. For example, several middle managers indicated that they required additional human resources but that top managers were frequently unwilling to grant middle managers the access to financial resources or authority necessary to hire human resources. Consequently, many middle managers felt overwhelmed with the amount of HDC-related work that they shouldered, and their commitment to HDC implementation decreased. Top managers may find that the boon to implementation effectiveness resulting from maintaining middle managers’ commitment to innovation implementation may outweigh the cost associated with hiring additional human resources.

Second, top managers can manage middle managers’ perceptions that IP&Ps are lacking by identifying innovation implementation as an organizational priority. Top managers identify organizational priorities (Tushman & Romanelli, 1985); by identifying innovation implementation as an organizational priority, top managers communicate to middle managers that they care about innovation implementation. In turn, middle managers’ commitment to innovation implementation may increase. Indeed, my results suggest that middle managers responded to top managers’ direct cues (e.g., discussions with middle managers) and indirect cues (e.g., attending implementation-related events) about the importance of HDC implementation by increasing their commitment to HDC implementation.

Top managers can foster commitment to innovation implementation among middle managers by communicating openly, regularly, and informally with middle managers in specific terms about their implementation-related performance. Aim 2 results suggest conditions under which communication with top managers can increase middle managers’ commitment. Specifically, many middle managers whom I interviewed indicated that open communication with top managers in their health centers gave top managers sufficient
information to confidently support middle managers’ commitment to the HDC. Middle managers who reported having supportive top managers also indicated that they spoke regularly with top managers about HDC operations. This allowed middle managers to warn top managers about potential problems, troubleshoot existing problems, and share success stories with top managers. Further, many middle managers indicated that informal feedback was more valuable than formal performance reviews; informal feedback allowed them to resolve issues before they became problematic enough to report during formal performance reviews, which were often given just annually. Finally, several middle managers indicated that specific feedback increased their commitment to HDC implementation. One middle manager, for example, saw performance reviews as an opportunity to “overcome obstacles or to work through processes” with top managers (085). These results suggest that open, regular, informal communication with top managers in specific terms regarding implementation-related performance can increase middle managers’ commitment. Scholars have suggested three potential mechanisms through which such communication might foster commitment to innovation implementation among middle managers. Top managers may use performance reviews to: (1) counteract resistance to innovation implementation (Burgelman, 1983; Tushman & Romanelli, 1985); (2) discuss expectations with middle managers (Ketokivi & CastaÑer, 2004; Wooldridge, Schmid, & Floyd, 2008); and (3) role model commitment to innovation implementation (Solberg et al., 2000).

Top managers can remain attuned to the ways in which IP&Ps may increase middle managers’ commitment. My results indicate that a key aspect of open communication with middle managers is remaining attuned to the ways in which IP&Ps interact with middle managers’ commitment. That is, it is not enough simply to grant access to IP&Ps; top
managers must ensure that (1) IP&Ps have their intended effect and (2) no barriers exist that may limit the positive influence of IP&Ps on middle managers’ commitment. In Aim 2 analyses, I identified several mechanisms through which IP&Ps may increase middle managers’ commitment. For example, my results indicate that access to human resources alleviates strains among middle managers, thereby increasing their commitment to innovation implementation. Similarly, I found that incentives may only increase middle managers’ commitment if they involve recognition for a job well-done. Top managers can foster middle managers’ commitment to innovation implementation by assessing whether these conditions (e.g., alleviated strains, recognition) exist. If top managers find that IP&Ps do not have their intended effect, they can intervene by, for example, discussing with middle managers the need for additional human resources and the adequacy of support from existing human resources and making a concerted effort to recognize middle managers’ commitment to innovation implementation.

In Aim 2 analyses, I also identified variables that may limit the positive influence of IP&Ps on middle managers’ commitment. For example, I found that resistance to innovation implementation among providers limited the positive influence of access to human resources on middle managers’ commitment to HDC implementation. Top managers can counteract this by, for example, advocating for HDC implementation in personal conversations with resistant providers. Similarly, I found that access to training resources had a weak or even negative effect on middle managers’ commitment if training opportunities were burdensome or inconsistently offered. Top managers can counteract these threats by carefully selecting training opportunities and ensuring that training opportunities are consistently available. If training opportunities specific to the innovation are not consistently available, top managers
may consider supplementing with external but relevant training opportunities, perhaps through pharmaceutical or equipment companies. Top managers should also be sensitive to the extent to which middle managers are able to handle demands for assistance with innovation implementation from other facilities; I found that demands for assistance from other facilities often dampened the positive influence of local social network availability on middle managers’ commitment.

Results indicate that top managers themselves directly influence the extent to which IP&Ps positively influence middle managers’ commitment to innovation implementation. Indeed, I found in Aim 2 analyses that top managers’ support moderated the relationship between several IP&Ps and middle managers’ commitment (see table 6.5.2). For example, results indicate that when top managers attended training events, they demonstrated support for innovation implementation and amplified the positive influence of access to training resources on middle managers’ commitment. Similarly, I found that the strength of the influence of performance reviews on middle managers’ commitment depended on the degree to which top managers supported HDC implementation. In fact, in post hoc bivariate analyses, I found in that top managers’ support moderated relationships between (1) performance reviews and middle managers’ commitment and (2) access to human resources and middle managers’ commitment. These results suggest that top managers must remain attuned to how they promote or inhibit IP&Ps’ positive influence on middle managers’ commitment.

Summary
Results indicate that increasing middle managers’ commitment to innovation implementation has the potential to improve implementation effectiveness in health care organizations. Aim 1 and Aim 2 results conflicted in their findings regarding top managers’ role in contributing to an infrastructure that supports innovation implementation; however, taken together, they have important implications for how health care organizations can increase middle managers’ commitment to innovation implementation and, as a result, improve implementation effectiveness. In particular, my results suggest three opportunities for top managers to promote an infrastructure that supports innovation implementation: First, top managers can make it known that innovation implementation is a priority in the organization. Second, top managers can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance. Third, top managers can remain attuned to the ways in which IP&Ps may increase middle managers’ commitment. These results and their implications are compelling but, as I describe in detail below, several limitations should be taken into consideration. Despite these limitations, also described in detail below, the results have important implications for theory and practice.

7.3.2. Study limitations

Six main limitations should be taken into consideration when interpreting study results. First, the small sample size may have limited the statistical significance of relationships of interest. For example, the relationship between top managers’ support for an environment that encourages HDC implementation was statistically significant in bivariate analyses but not significant in OLS regression analyses. Likewise, Aim 1 findings suggested that the
interaction of performance reviews and top managers’ support was not statistically significantly related to middle managers’ commitment. This may be because only a minority of middle managers (36 percent) “agreed” or “strongly agreed” that employee performance reviews addressed HDC performance; most middle managers either reported that they “neither agreed nor disagreed” or “disagreed” that employee performance reviews addressed their HDC-related performance. A larger sample may have had sufficient variation to bear out Aim 2 findings that top managers’ support (1) had a positive relationship with middle managers’ commitment and (2) moderated the relationship between performance reviews and middle managers’ commitment to innovation implementation.

Second, cross-sectional design of the study limited my ability to draw causal conclusions regarding the relationship between middle managers’ commitment and implementation effectiveness and between top managers’ support and middle managers’ commitment. Specifically, reverse causality may be a concern in my study: Middle managers may be more committed in health care organizations with greater implementation effectiveness, and top managers may be more supportive when middle managers are committed to innovation implementation. Indeed, Aim 2 analyses indicated that middle managers coerced top managers to embrace the HDC, either by directly confronting them or waiting until institutional pressures required health centers to implement the quality improvement methods espoused in the HDC. The mixed-method approach of the study, however, allowed me to establish the temporality of IP&Ps and middle managers’ commitment. The middle managers whom I interviewed indicated that, as I hypothesized, middle managers’ commitment increased implementation effectiveness, and performance reviews increased middle managers’ commitment. Specifically, middle managers engaged in activities that increased
implementation effectiveness. For example, middle managers changed health center systems to ensure that HDC flow sheets were available to providers during patient visits; this encouraged providers to use an HDC-related tool. Further, the middle managers whom I interviewed indicated that, subsequent to openly communicating with top managers, performance reviews bolstered middle managers’ commitment to HDC implementation. It should also be noted that, despite the limitations associated with the cross-sectional nature of the survey used in Aim 1 analyses, the survey represents an ideal data source for the study because it pertains to an innovation that was simultaneously implemented in multiple health care organizations. Studying multiple organizations improves the generality of results; studying a single innovation permits the use of a single and consistent measure of implementation effectiveness. Further, the survey fulfills Weiner, Amick, and Lee’s (2008) criteria for measuring organizational readiness for change: The survey specifically focused on respondents’ attention to HDC implementation, aggregated individual middle managers’ appraisals of their health centers’ capabilities as a whole, and surveyed multiple organizations. Secondary data of this kind are scarce given the novelty of the research topic.

Third, due to data constraints, Aim 1’s analytical model excluded some potentially important determinants of middle managers’ commitment to innovation implementation and implementation effectiveness. For example, middle managers’ involvement in the decision to adopt the HDC may have influenced their commitment to HDC implementation, and the availability of community resources may have influenced community linkage implementation effectiveness. In addition, the quadrants into which I categorized middle managers based on their level of commitment to innovation implementation and the effectiveness of HDC implementation in their health centers systematically differed based on variables that I did
not include in my analyses. For example, reports that limited access to human resources or poor teamwork among health center employees decreased commitment to HDC implementation were particularly common among middle managers in the low commitment to HDC implementation quadrants. Differences among quadrants may have been related to unmeasured variables, such as innovation-values fit. Indeed, Klein and Sorra’s (1996) model of implementation effectiveness suggests that innovation-values fit is a determinant of implementation effectiveness (Klein & Sorra, 1996). Future research should take into account these and other potentially important variables that were omitted from my analyses.

Data constraints may also have limited the validity of some measures used in Aim 1 analyses. For example, as I described in detail in section 6.2, in addition to regularly using the HDC listserv, virtual classroom, and web page (measures of middle managers’ commitment to HDC implementation in Aim 1 analyses), the middle managers whom I interviewed identified several other activities in which they engaged to demonstrate their commitment to HDC implementation. As a result, some middle managers may not have been categorized into appropriate quadrants. For example, some middle managers in the high commitment to HDC implementation quadrants indicated that they were uncommitted to HDC implementation. Similarly, some middle managers in the low commitment to HDC implementation quadrants exhibited high commitment to HDC implementation. In addition to the narrow definition of middle managers’ commitment used in Aim 1 analyses, inconsistencies between survey responses and the commitment that the middle managers whom I interviewed expressed might also be related to biases that may be associated with self-reported data: social desirability bias (i.e., middle managers wanted to sound as committed to innovation implementation as possible); recall bias (i.e., during interviews,
middle managers did not accurately recall how committed they were to innovation implementation in calendar year 2004); after-the-fact rationalization of previous behavior; or poorly worded survey questions. Although this may seem to suggest that survey data may be unreliable, as I discussed in section 6.4, the indicators that I used for middle managers’ commitment to innovation implementation were likely to be relevant: The middle managers whom I interviewed indicated that using the HDC listserv, virtual classroom, and web page represented their effort to enable health center employees to implement the HDC as effectively as possible. Future research, however, should consider other indicators of middle managers’ commitment to innovation implementation.

Data constraints may have compromised the validity of several other Aim 1 measures. Specifically, the survey data used in Aim 1 were not intended to measure implementation effectiveness, middle managers’ commitment, or IP&Ps; I used items from an existing survey to construct these variables. And, although I relied on psychometric testing and the advice of experts in job design, health care organization delivery and change, care and outcomes for vulnerable patients with chronic disease, and two middle managers who participated in the HDC and completed the survey to aid in identifying pertinent survey items, none of the variables were validated for the purposes of this study. Future research should develop surveys comprised of instruments validated specifically for the purpose of measuring implementation effectiveness, middle managers’ commitment, and IP&Ps.

Fourth, with the exception of organizational size and location, I used only middle managers’ responses to construct both dependent and independent variables. For example, I constructed implementation effectiveness variables based on only middle managers’ responses to survey items. The common method variance model asserts that “the observed
variables are contaminated by a single unmeasured factor that has an equal effect on all of them” (Lindell & Whitney, 2001). In this case, the unmeasured factor is the variance associated with responding middle managers. As such, cognitive dissonance, self-deception, social desirability, the availability heuristic, confirmation bias, and several other psychological biases may have lead committed middle managers to report implementation in their health centers as effective. To account for this variance, in each ordinary least squares regression model, I included a survey item that was not theoretically related to implementation effectiveness or middle managers’ commitment. Also guarding against common method variance was the length of the survey: it was short enough to avoid transient mood states such as boredom and fatigue (Lindell & Whitney, 2001).

Aim 2 interviews also included only middle managers; middle managers’ responses were not verified by other employees in middle managers’ health centers. Middle managers’ perceptions of their commitment and access to IP&Ps may have differed from the perceptions of other health center employees. Specifically, middle managers may have believed that they did not have access to certain IP&Ps when in fact the IP&Ps were available. For example, middle managers may not have been aware of training resources or incentives that were available to them for implementation. My goal in discussing IP&Ps with the middle managers whom I interviewed, however, was not to objectively measure middle managers’ access to IP&Ps; rather, my goal was to understand middle managers’ perceptions of their access to IP&Ps. Indeed, the theory of perceived organizational support suggests that increased commitment to innovation implementation is likely to result from middle managers’ psychological reactions to an organization’s favorable treatment. Middle managers’ commitment to innovation implementation, on the other hand, is a behavioral
manifestation of middle managers’ effort and engagement in activities that enable innovation implementation. As such, middle managers’ responses to questions regarding their commitment to innovation implementation might not accurately represent their effort and engagement in activities to enable innovation implementation. Future research should use the responses of other health center employees to validate middle managers’ responses to questions regarding their commitment to innovation implementation.

Fifth, middle managers in this study may have been more motivated than other middle managers; whereas other middle managers are often promoted or appointed to their position, middle managers in this study were selected through a mutual process of volunteering and appointment by their health centers’ CEOs based on leadership skills and personality; however, I found little evidence to suggest that the middle managers in this study were more motivated than other middle managers. In fact, middle managers with varying levels of commitment to innovation implementation were represented in the study, limiting the bias associated with a sample of middle managers who may be more motivated than middle managers who were not included in this study.

Sixth, study participants included middle managers in relatively small health centers in 10 Midwestern and West Central states. Health centers differ from other types of health care organizations, such as hospitals and nursing homes, in several respects. However, health centers offer a compelling setting for implementation research; the debate around health care reform has emphasized the need for increased focus on primary care, and health centers provide primary care to an ever-increasing proportion of Americans (U.S. Department of Health and Human Services, 2008). It should also be noted that only one interview participant for each health center was included in Aim 2 analyses. Nevertheless, my goal was
not to seek generalizability in conducting Aim 2; my goal was to achieve the depth and complexity associated with middle managers’ experience in implementing innovations in health centers.

7.4. Implications and directions for future research

7.4.1. Implications for theory

Despite assertions that individuals are willful agents of change or resistance (Damschroder et al., 2009), extant implementation effectiveness research takes for granted middle managers’ commitment to innovation implementation. In fact, middle managers’ commitment has been excluded from extant theoretical models of implementation effectiveness (Klein et al., 2001; Klein & Sorra, 1996). My study results indicate that middle managers’ commitment influences implementation effectiveness. Moreover, results indicate that middle managers’ commitment varies, so it cannot be taken for granted. These results suggest that future theoretical models of implementation effectiveness must take into account middle managers’ commitment to innovation implementation.

My study also contributes to theoretical models of implementation effectiveness by proposing why middle managers’ commitment influences implementation effectiveness. Specifically, I used the theory of perceived organizational support to argue that employees view IP&Ps a sign that their organization cares about innovation implementation; employees whose organizations offer IP&Ps increase their commitment to innovation implementation in support of their organization’s position. Indeed, the middle managers whom I interviewed described a sense of obligation to health centers that had provided them with IP&Ps, and the proposed relationships between several IP&Ps and middle managers’ commitment received
empirical support. Specifically, I found that top managers have an important role in developing an infrastructure to foster middle managers’ commitment: They can create an infrastructure in which innovation implementation is viewed as an organizational priority; they can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance; and they can remain attuned to the way in which IP&Ps increase middle managers’ commitment to innovation implementation. These findings suggest a more intricate theoretical model for implementation effectiveness than currently exists: Extant theoretical models suggest that top managers’ support influences implementation effectiveness; my findings elaborate on this relationship by providing specific suggestions regarding the ways in which top managers may influence innovation implementation.

7.4.1. Implications for practice

The results of this study indicate that the implementation of innovations in health care organizations remains suboptimal; the gap between evidence and practice persists. By revealing middle managers’ role in innovation implementation, however, this study offers an opportunity to improve implementation effectiveness. Increased attention to empowering middle managers to commit to innovation implementation has the potential to improve implementation effectiveness. In particular, middle managers must be empowered to mediate between the strategy of adopting an innovation and the integration of the innovation into day-to-day activities (i.e., implementation); “sell” innovation implementation to frontline employees; and create knowledge about innovation implementation through social networks.
I found that middle managers’ commitment can be empowered to engage in these activities with an infrastructure that supports innovation implementation. I found that many middle managers perceived IP&Ps in their health centers to be lacking; top managers are in a key position to promote an infrastructure that modifies this perception. I describe the three ways in which they can do so below in turn.

First, top managers can make it known that innovation implementation is a priority in the organization. In particular, top managers can grant middle managers access to IP&Ps that middle managers consider to be important for innovation implementation. Additionally, top managers can indirectly communicate that innovation implementation is a priority by, for example, attending implementation-related events; they can directly communicate that innovation implementation is a priority by discussing with middle managers that innovation implementation is an organizational priority to which they should be committed. Top managers should assess how openly they express support for innovation implementation and the ways in which they express support for innovation implementation: Do they clearly and emphatically communicate support? Do they do so in a variety of ways that are apparent to middle managers?

Second, top managers can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance. This allows middle managers to warn top managers about potential implementation-related problems, troubleshoot existing problems, and share success stories; resolve implementation-related issues before they become problematic enough to report during formal performance reviews; and overcome obstacles and work through processes with top managers. Top managers can use open, regular, and informal communication with middle managers as an opportunity to:
(1) counteract resistance to innovation implementation; (2) discuss expectations; and (3) role model commitment to innovation implementation. Top managers should assess current strategies for communicating with middle managers regarding their commitment to innovation implementation. More generally, top managers should consider their relationships with middle managers: How openly do they communicate with middle managers? How often? Do they only communicate during formal performance reviews? How specific is the feedback that top managers provide to middle managers?

Third, top managers can remain attuned to the ways in which IP&Ps may increase middle managers’ commitment. That is, it is not enough simply to grant access to the IP&Ps; top managers must ensure that the IP&Ps have their intended effect (e.g., access to human resources alleviates strains among middle managers) and that no barriers exist that may limit the positive influence of IP&Ps on middle managers’ commitment (e.g., resistance to innovation implementation among providers does not increase strains among middle managers). In particular, top managers must be aware of the ways in which their own support for innovation implementation moderates the influence of IP&Ps on middle managers’ commitment. For example, whereas supportive top managers have the potential to bolster the positive influence of performance reviews on middle managers’ commitment, unsupportive or apathetic top managers can limit the positive influence of performance reviews on middle managers’ commitment and, in some cases, cause performance reviews to decrease middle managers’ commitment. Top managers should assess how intricate their understanding of how the IP&Ps that their organization offers influence middle managers’ commitment: Are they aware of when IP&Ps fail to have their intended effect? Do they have ideas about how to bolster the positive influence of IP&Ps on middle managers’ commitment?
7.4.3. *Directions for future research*

Despite the contribution that this study has made to implementation scientists’ understanding of middle managers’ role in innovation implementation in health care organizations, several questions remain. First, given the small sample size in this study and the related limitations, studies with larger sample sizes are warranted. Indeed, larger sample sizes may bear out hypothesized relationships among top managers’ support, performance reviews, and middle managers’ commitment to innovation implementation. Second, future research should use existing validated instruments or initiate the validation of instruments for measuring the key variables included in this study; data constraints may have compromised the validity of several Aim 1 variables, including implementation effectiveness, middle managers’ commitment, and IP&Ps. Further, future research should explore how the diversity of perceptions regarding IP&Ps among employees in middle managers’ organizations relates to middle managers’ commitment to innovation implementation. Due to data constraints, I used middle managers’ responses alone to construct independent variables. Other employees in middle managers’ health centers, however, may have responded to survey questions regarding IP&Ps differently from middle managers. Understanding the separation, variety, and dispersion among employees’ perceptions of IP&Ps may elucidate whose perceptions of organizational support influence middle managers’ commitment to innovation implementation (Harrison & Klein, 2007). For example, the extent to which top managers’ beliefs regarding whether administrative employees are sufficiently involved in innovation implementation diverge from providers’ beliefs may have consequences for
middle managers’ commitment to innovation implementation; commitment to innovation implementation among middle managers may be greater in organizations in which top managers’ and providers’ beliefs are closely aligned.

Third, mediators and moderators of the relationship between middle managers’ commitment to innovation implementation and implementation effectiveness remain unclear. Information regarding mediators and moderators of the relationship between middle managers’ commitment and implementation effectiveness may provide the most effective mechanisms for increasing implementation effectiveness. For example, I found that middle managers demonstrated commitment to HDC implementation by changing health center systems. In turn, changed health center systems may have decreased strains among frontline employees such as providers; decreased strains may have enabled providers to connect patients with community resources, an indicator of HDC implementation effectiveness. In this sense, decreased strains among providers may mediate the relationship between middle managers’ commitment and implementation effectiveness. Other dynamics may apply in health care organizations with more than one middle manager overseeing innovation implementation. For example, committed middle managers may compensate for uncommitted middle managers’ negative influence on implementation effectiveness; conversely, uncommitted middle managers may limit committed middle managers’ positive influence on implementation effectiveness (Grant, 2009). Understanding these relationships will enable implementation scientists to provide clear recommendations for promoting implementation effectiveness. Further, focusing recommendations for promoting implementation effectiveness will require understanding under which conditions which of the many manifestations of middle managers’ commitment is most critical: “selling” innovation
implementation to frontline employees, synthesizing information for frontline employees, creating knowledge through social networks, or mediating between strategy and day-to-day activities.

A potential mediator of the relationship between middle managers’ commitment and implementation effectiveness of particular interest is implementation climate—employees’ “shared summary perceptions of the extent to which their use of a specific innovation is rewarded, supported, and expected” in health care organizations (Klein & Sorra, 1996). Indeed, the middle managers whom I interviewed were keenly aware of the effect of their own feelings about the HDC on frontline employees’ perceptions of HDC implementation. As a result, many middle managers engaged in self-monitoring. In some respects, this involved (1) stifling their emotions for the sake of contributing to a climate in which implementing the HDC was rewarded, supported, and expected and (2) role modeling effort toward implementing the HDC. I did not measure implementation climate in this study, however. Future research should do so.

Fourth, future research on middle managers’ role in innovation implementation should take into account potentially important determinants of middle managers’ commitment to innovation and implementation effectiveness that, due to data constraints, were omitted from my analyses. For example, middle managers’ involvement in the decision to adopt the HDC may have influenced their commitment to HDC implementation, and Klein and Sorra’s (1996) model of implementation effectiveness suggests that innovation-values fit is a determinant of implementation effectiveness (Klein & Sorra, 1996). Indeed, the HDC had a unique fit with the values of middle managers in community health centers: Middle managers in community health center may have been less receptive to another innovation, and middle
managers in another type of health care organization may have been less receptive to the HDC. One could assess innovation-values fit by introducing variation in the innovation or the type of health care organization. Indeed, my study assessed middle managers’ role in community health centers in the Midwest and West Central regions of the United States. Community health centers may systematically differ from other types of health care organizations. For example, improving the quality of nursing home care is a national priority (Institute of Medicine, 2001), but nursing homes were the least common organizational setting in studies of quality improvement implementation (Alexander, 2008). As such, researchers and practitioners could benefit from a study of middle managers’ role in innovation implementation in nursing homes.

7.5. Conclusion

This study assessed the role of middle managers in innovation implementation in health care organizations. Specifically, the study’s aims were (1) to assess the relationships among IP&Ps, middle managers’ commitment to innovation implementation, and implementation effectiveness in health care organizations and (2) to enhance Aim 1 analyses, and to explore moderators and mediators of the relationship between IP&Ps and middle managers’ commitment to innovation implementation in health care organizations. In achieving these aims, the study advances knowledge a poorly understood aspect of innovation implementation in health care organizations. The study also identifies high-leverage ways for health care organizations to facilitate successful innovation implementation.

Study results indicate that HDC implementation was suboptimal; however, middle managers’ commitment to innovation implementation is positively related to implementation
effectiveness, and middle managers’ commitment to innovation implementation varies. Taken together, these results suggest that middle managers have the potential to improve implementation effectiveness. Middle managers are empowered to commit to innovation implementation when they work within an infrastructure that supports innovation implementation.

The study addresses several scholars’ calls for an investigation of middle managers’ role in organizational strategy such as innovation implementation (Dess, 1987; Wooldridge & Floyd, 1989; Wooldridge et al., 2008). It extends existing conceptual frameworks for implementation effectiveness by expounding on the role of middle managers – the very employees who are most frequently charged with translating strategy such as innovation implementation into practice. It also provides theory regarding why middle managers influence implementation effectiveness. Further, study findings suggest practical, high-leverage ways for health care organizations to facilitate the translation of evidence into practice with actionable, specific guidelines: Top managers can make it known that innovation implementation is an organizational priority; they can communicate openly, regularly, and informally with middle managers in specific terms about their implementation-related performance; and they can remain attuned to the ways in whichIP&Ps may increase middle managers’ commitment.
APPENDIX 1: Recruitment Phone Call, Consent, and Screening Questions

CONSENT TO IDENTIFY 2004 SURVEY RESPONSES AND PARTICIPATE IN INTERVIEW:

Hi. This is Sarah Birken calling. May I please speak with <<PREFIX>> <<SUBJECT LNAME>>?

IF UNAVAILABLE: Is there a more convenient time when I may call?

IF NO: Thank you for your time. Goodbye.

IF YES, continue

I am calling to follow up on a note that I sent a couple of weeks ago about a study that is being conducted by the University of North Carolina at Chapel Hill’s Gillings School of Global Public Health. May I tell you a bit more about the study?

IF YES: Marshall Chin, MD MPH of the University of Chicago Pritzker School of Medicine, Shou-Yih Daniel Lee, Associate Professor of the University of North Carolina at Chapel Hill Department of Health Policy and Management, and I are working with a team of experts to explore the conditions under which Team Leaders’ support increases implementation. You may be able to help me. I am contacting you because I understand that you have been a Team Leader for the Health Disparities Collaborative. Is that right?

IF NO: I am sorry, but you are not eligible to participate in the study because you have not been a Team Leader for the Health Disparities Collaborative.

IF YES: I am requesting your consent to identify your responses to a self-administered survey regarding the Health Disparities Collaborative that you completed in 2004. I currently have aggregate responses from all Team Leaders who completed the survey, but I am currently seeking your permission to identify your specific responses to survey questions. If you consent, identifying your responses to survey questions would require no effort on your part. Based on your responses to the 2004 survey, you may qualify to participate in an interview regarding your experience in implementing the Health Disparities Collaboratives. May I tell you about what the interview would entail?

IF NO: Thank you for your time.
IF YES: Marshall Chin, MD MPH of the University of Chicago Pritzker School of Medicine, Shouou-Yih Daniel Lee, Associate Professor of the University of North Carolina at Chapel Hill Department of Health Policy and Management, and I are working with a team of experts to explore the conditions under which Team Leaders’ support increases implementation. If you agree to participate, I will conduct an interview that will last approximately 60-90 minutes. If you agree, I will record the interview. This will help to make sure that I correctly understand what you say. If you agree, I might contact you after the interview to make sure that I correctly understood what you said. The interview can take place over the phone at a time that is convenient to you. During the interview, I will ask you questions regarding your experience as the Team Leader during the implementation of the Health Disparities Collaborative. For example, I will ask you about the support from the top management team at your health center. Approximately sixteen Team Leaders will participate in the study.

Participating in this study is completely voluntary. You may refuse to participate, or you may withdraw your consent to participate at any time. This research is designed to benefit society by gaining new knowledge. You will not benefit personally from being in this research study. The knowledge that I gain from this study could help us to understand Team Leaders’ critical role in implementing innovations such as the Health Disparities Collaborative.

The risk of participating in the study is that there is the potential of loss of privacy due to the personal nature of some of the questions asked in the interview. Every attempt will be made to keep all information from the interview confidential and used only for the purposes of this study. For example, the information that could be used to identify you will be kept separate from all other research information. The link between your identification and research information will be kept secure. All research personnel have signed a written agreement not to divulge, publish, or otherwise make known to unauthorized persons or to the public any information obtained in the course of this study that could identify the people who participated in the study. Information that could be used to identify you will be kept separate from all research information. At the beginning of the study, I will create a file that links your name to a study identification number. This file will be encrypted and password protected and only the principal investigator will have access to it. When the study is completed and I have no reason to link your name with this identification number, this electronic file will be destroyed. Your name will not appear on the interview transcript, only your study identification number. Only research team members will have access to the data I collect. Electronic data will be stored in password-protected files on password-protected computers. Written data will be stored in locked filing cabinets in locked offices. Data will be kept only as long as necessary to analyze and report study findings. At that point, all data will be destroyed. No one who participates in this study will be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. In the case of this study, this is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.
You will receive a $25 VISA gift card upon completion of the interview. The only cost of participation is your time. This is an unfunded study.

If you have any questions about your rights as a research subject, you can call the University of North Carolina’s Institutional Review Board at 919-966-3113.

Do you have any questions?

Do you consent to participate in this research study?

    IF NO: Thank you for your time. Goodbye.

IF YES: I will be in contact within the next couple of months to let you know whether you qualify to participate in an interview and, if so, to schedule the interview. Thank you for your time. Goodbye.

IDENTIFYING RESPONSES TO 2004 SELF-ADMINISTERED SURVEY AND SCHEDULING:

Hi. This is Sarah Birken calling. May I please speak with <<PREFIX>> <<SUBJECT LNAME>>?

    IF UNAVAILABLE: Is there a more convenient time when I can call?

    IF NO: Thank you for your time. Goodbye.

IF YES, continue

I am calling to follow up on some questions that I recently asked you to determine whether you qualify to participate in a study that is being conducted by the University of North Carolina at Chapel Hill’s Gillings School of Global Public Health. [FOR THOSE WHO DO NOT QUALIFY:] Based on your responses, you do not qualify to participate in the study. Thank you so much for your time, though. [FOR THOSE WHO DO QUALIFY:] Based on your responses, you do qualify to participate in the study. If you’re still willing to participate in an interview, I’d like to schedule the interview at this time. Would that be okay?

    IF NO: Thank you for your time. Goodbye.

IF YES: Thank you very much. Ideally, the interview will take place over the phone in a place where you will not be overheard, such as a closed office or your home. What time would be best for you?
APPENDIX 2: Interview Guide

Date: _________________________

Study ID: ______________________

Thank you so much for agreeing to talk with me today.

Is there an office with a closed door available so that you can speak freely?

If it’s okay with you, I’d like to digitally record this interview. If you’d like me to stop recording at any time, please let me know and I’ll shut off the recorder. Also, please remember that you can always decline to answer any of my questions.

This is a pretty structured interview. I’m going to ask you the same questions about several things, so I apologize if I sound repetitive. But that will help make sure that I make the best use of your time and get the information that I’m looking for. Still, I encourage you to share specific examples and anecdotes that illustrate your experience. You’ll see that I’m interested in hearing about whether top managers in your organization (like the CEO, CFO, medical director, etc) offered IP&Ps (specifically, incentives; performance reviews; access to financial, human, and training resources; local social network involvement; and top managers’ support) on their free will or whether they had to for some reason. I’m also interested in knowing the ways in which access to those IP&Ps might have affected your engagement in activities related to implementing the HDC.

I’m going to start off by asking you about your engagement in activities related to implementing the HDC, and then I’ll ask you to spend most of the rest of the time talking about IP&Ps.

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<thead>
<tr>
<th>Theoretical Construct</th>
<th>Interview Question(s)</th>
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<tbody>
<tr>
<td>Middle manager commitment to HDC implementation</td>
<td>First let’s talk about your engagement in activities related to implementing the HDC.</td>
</tr>
<tr>
<td></td>
<td>□ Can you tell me about the primary activities that you engaged in related to implementing the HDC? What were they? For example, did you check the collaborative webpage? Use the collaborative listserv? Virtual classroom?</td>
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</table>
Theoretical Construct | Interview Question(s)
---|---
| □ How often did you engage in those activities? |
| □ Did the types of activities you engaged in and the frequency with which you engaged in them change over the course of HDC implementation? |
| □ Did you feel like you should engage in those activities? If so, why? For example, did you feel as though you needed to reciprocate the good treatment that you received in your health center? |
| The next question might seem a bit strange, but… |
| □ Would you say that you felt a sense of belonging in the HDC? |

IP&Ps | Now let’s talk about IP&Ps at your health center and how this influenced your engagement in activities related to implementing the HDC.

Incentives | The first IP&P is incentives.
| □ Were any HDC-related incentives offered to you at your health center, like career promotion opportunities or professional development activities? |
| □ Were there other HDC-related incentives, like personal or public recognition, compensation time, or pay? |
| □ What, specifically, did you have to do to receive those incentives? Was that clear to you? |
| □ How did HDC-related incentives (or lack thereof) influence your engagement in HDC-related activities? |

Moderators | □ Did you get the sense that top managers like your organization’s CEO, CFO, or medical director had to offer those incentives, maybe because of some industry standard? |
| □ If so, did the fact that the incentives weren’t being offered based on top managers’ free will affect your engagement in activities related to HDC implementation? |
| □ If not, how important was it to you that the incentives were offered based on top managers’ free will in terms of how the incentives affected your engagement in activities related to HDC implementation? |

Mediators | Now I’d like to hear about the ways in which HDC-related incentives might have influenced your engagement in activities related to HDC implementation.
| □ How did HDC-related incentives influence your identification with and interest in HDC implementation? |
| □ How did HDC-related incentives influence your job satisfaction? |
| □ What about your mood? |
| □ Emotional or physical strains like stress or headaches? |
| □ You mentioned that HDC-related incentives influenced [list applicable mediators here]. Did any of those changes influence your engagement in activities related to HDC implementation? If so, how? |

Performance reviews | Now let’s talk about the performance reviews at your health center.
| □ Did you receive performance reviews when you were implementing the
<table>
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<th>Theoretical Construct</th>
<th>Interview Question(s)</th>
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<tbody>
<tr>
<td>HDC?</td>
<td>□ If so, were there any items on the performance review that evaluated your performance with respect to your engagement in activities related to implementing the HDC?</td>
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<td></td>
<td>□ If not, how did the lack of feedback from performance reviews influence your engagement in HDC-related activities?</td>
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<td></td>
<td>□ If so, please tell me about the feedback that you got. How did you respond to the feedback? For example, let’s say that you received feedback that your engagement in activities was really driving forward HDC implementation, or that your lack of engagement in activities was impairing HDC implementation.</td>
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<td></td>
<td>□ Did you use that feedback to alter your engagement in activities related to HDC implementation moving forward?</td>
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<td></td>
<td>□ Did you get the sense that top managers had to conduct performance reviews, maybe because of some industry standard?</td>
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<td></td>
<td>□ If so, did the fact that the performance reviews weren’t being conducted based on top managers’ free will affect your engagement in activities related to HDC implementation?</td>
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<td></td>
<td>□ If not, how important was it to you that the performance reviews were conducted based on top managers’ free will in terms of how the performance reviews affected your engagement in activities related to HDC implementation?</td>
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<tr>
<td></td>
<td>□ And how did performance reviews influence your identification with and interest in HDC implementation?</td>
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<td></td>
<td>□ How did performance reviews influence your job satisfaction?</td>
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<tr>
<td></td>
<td>□ What about your mood?</td>
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<td>□ Emotional or physical strains like stress or headaches?</td>
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<td></td>
<td>□ You mentioned that HDC-related incentives influenced [list applicable mediators here]. Did any of those changes influence your engagement in activities related to HDC implementation? If so, how?</td>
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<tr>
<td>Moderators</td>
<td>□ Did you use that feedback to alter your engagement in activities related to HDC implementation moving forward?</td>
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<tr>
<td>Mediators</td>
<td>□ Did you get the sense that top managers had to conduct performance reviews, maybe because of some industry standard?</td>
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<tr>
<td>Top managers’ support</td>
<td>□ How did their support or lack thereof for HDC implementation influence your engagement in HDC-related activities?</td>
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<td>□ If so, how? For example, did top managers help you to get &quot;buy-in&quot; for HDC implementation from providers?</td>
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<td></td>
<td>□ Did they try to create an environment where the HDC was given high priority?</td>
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<td></td>
<td>□ Did they offer you training in quality improvement techniques?</td>
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<td></td>
<td>□ What about information system technical support?</td>
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<tr>
<td>Theoretical Construct</td>
<td>Interview Question(s)</td>
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<tr>
<td>Moderators</td>
<td>□ Did they support HDC implementation in any other ways?</td>
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<td></td>
<td>□ Did you get the sense that top managers <em>had to</em> support you in these ways, maybe because of some industry standard?</td>
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<td>□ If so, did the fact that the top managers weren’t supporting you of their <em>free will</em> affect your engagement in activities related to HDC implementation?</td>
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<tr>
<td>Mediators</td>
<td>□ If not, how important was it to you that the top managers were supporting you of their <em>free will</em> in terms of how their support affected your engagement in activities related to HDC implementation?</td>
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<td>□ And how did their support influence your <em>identification with and interest in</em> HDC implementation?</td>
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<td>□ How did their support influence your <em>job satisfaction</em>?</td>
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<td>□ What about your <em>mood</em>?</td>
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<td>□ Emotional or physical <em>strains</em> like stress or headaches?</td>
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<tr>
<td>Local social network involvement</td>
<td>□ Do you recall whether other health centers with which you regularly communicated were participating in the HDC?</td>
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<td>□ If so, how did their participation influence your <em>engagement</em> in activities related to HDC implementation?</td>
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<td>□ If not, would it have been helpful to you if other health centers with which you regularly communicated had participated in the HDC?</td>
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<td>[Not applicable]</td>
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<td>□ And how did that influence your <em>identification with and interest in</em> HDC implementation?</td>
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<td>□ How did it influence your <em>job satisfaction</em>?</td>
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<td>□ What about your mood?</td>
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<td></td>
<td>□ Emotional or physical <em>strains</em> like stress or headaches?</td>
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<td></td>
<td>□ You mentioned that HDC-related incentives influenced [list applicable mediators here]. Did any of those changes influence your <em>engagement</em> in activities related to HDC implementation? If so, how?</td>
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<tr>
<td>Access to financial resources</td>
<td>Now let’s talk about financial resources.</td>
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<td>□ Did your health center receive <em>funding for training</em> in quality improvement techniques?</td>
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<td>□ What about <em>information system technical support</em>?</td>
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<td>□ <em>Data entry activities</em>?</td>
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<td>□ <em>Staff time</em> spent on the HDC?</td>
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<td></td>
<td>□ How did access to those financial resources or lack thereof influence your <em>engagement</em> in activities related to HDC implementation?</td>
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<tr>
<td>Theoretical Construct</td>
<td>Interview Question(s)</td>
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| **Moderators**        | □ Did you get the sense that top managers *had* to offer you access to these financial resources, maybe because of some industry standard?  
□ If so, did the fact that the top managers didn’t offer access to the financial resources of their *free will* affect your engagement in activities related to HDC implementation?  
□ If not, *how important* was it to you that the top managers offered you access to financial resources you of their *free will* in terms of how their support affected your engagement in activities related to HDC implementation?  
□ And how did access to financial resources influence your identification with and interest in HDC implementation?  
□ How did access to financial resources influence your job satisfaction?  
□ What about your mood?  
□ Emotional or physical *strains* like stress or headaches?  
□ You mentioned that HDC-related incentives influenced [list applicable mediators here]. Did any of those changes *influence your engagement* in activities related to HDC implementation? If so, how? |
| **Mediators**         | Now I’d like to hear about how the participation of other staff were in HDC implementation, like providers, nursing staff, front desk staff, medical records staff, and data entry staff.  
□ Were there *particular administrative or clinical staff* whose help was particularly important in implementing the HDC? How so?  
□ How did their participation or lack thereof influence your engagement in activities related to HDC implementation?  
□ Did you get the sense that top managers *had* to offer you access to the time of these staff for HDC implementation, maybe because of some industry standard?  
□ If so, did the fact that the top managers didn’t offer access to the time of these staff of their *free will* affect your engagement in activities related to HDC implementation?  
□ If not, *how important* was it to you that the top managers offered you access to the time of these staff of their *free will* in terms of how their support affected your engagement in activities related to HDC implementation?  
□ And how did the participation of other staff influence your identification with and interest in HDC implementation?  
□ How did the participation of other staff influence your *job satisfaction*?  
□ What about your mood?  
□ Emotional or physical *strains* like stress or headaches?  
□ You mentioned that HDC-related incentives influenced [list applicable mediators here]. Did any of those changes influence your engagement in activities related to HDC implementation? If so, how? |
| **Access to human resources** | |
| **Moderators**        | |

204
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<tr>
<th>Theoretical Construct</th>
<th>Interview Question(s)</th>
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<tr>
<td>Mediators</td>
<td>Did any of those changes influence your engagement in activities related to HDC implementation? If so, how?</td>
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<tr>
<td>Access to training resources</td>
<td>There are just a few more questions now. Let’s talk about the HDC-related training in helping patients self-manage their illness, encouraging providers to follow practice guidelines and using flow sheets, and improving information systems that you and HDC staff received.</td>
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<tr>
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<td>□ What kind of training was offered to you, if any?</td>
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<td>□ How did this training (or lack thereof) influence your engagement in activities related to implementing the HDC?</td>
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<td>□ Did you get the sense that top managers had to offer you this training, maybe because of some industry standard?</td>
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<td>□ If so, did the fact that the top managers didn’t offer the training of their free will affect your engagement in activities related to HDC implementation?</td>
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<td>□ If not, how important was it to you that the top managers offered you training of their free will in terms of how their support affected your engagement in activities related to HDC implementation?</td>
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<td></td>
<td>□ And how did training influence your identification with and interest in HDC implementation?</td>
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<td>Moderators</td>
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<tr>
<td>Mediators</td>
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<tr>
<td>Implementation</td>
<td>Finally, let’s talk about metrics for success with the HDC.</td>
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<tr>
<td>effectiveness</td>
<td>□ Did anyone communicate to you the metrics for success related to the HDC? If so, what were those metrics for success?</td>
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<td>□ Did others in your organization have the same understanding of the HDC-related metrics for success?</td>
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<td>□ Do you know what top managers in your organization considered to be HDC-related metrics for success?</td>
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<td>□ Were those the same as the ones that you understood to be HDC-related metrics for success?</td>
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□ Is there anything that I haven’t asked you about today that you think I might like to know about your experience as the HDC Team Leader at your health center?

Thanks for your time!
APPENDIX 3: Interview Codes, Descriptions, and Examples

NOTES:

Both positive and negative responses (e.g., “yes incentives influenced my commitment” or “no they did not”) were coded.

Both straightforward identification of issues (e.g., “I had a lot of autonomy”) and discussion of the implications (e.g., “I was able to make decisions quickly because I didn’t have to ask for permission from top managers constantly”) were coded.

Code: Adoption circumstances
Details: I began the interviews by asking the middle managers how they became involved in the Health Disparities Collaborative (HDC). This gave me a sense of what position they held at the health center prior to the HDC and how they initially felt about having to implement the HDC.
Example: “Well, it wasn’t really voluntarily. The nurse practitioner before me was one that started with the collaborative and I think they only met like one or two times before and then she resigned and I was the only nurse practitioner at the time so it just kind fell on me.”

Code: Autonomy
Details: This is a sub-code of top managers’ support. It relates to a middle managers’ sense of his or her ability to make decisions and act on his or her own discretion. I also used this code for the opposite of autonomy (i.e., being micromanaged).
Example: (1) “I wasn’t in a position where I felt that I had to run every little change by our CEO. So, yeah, given that responsibility and kind of being empowered to make changes I think definitely facilitated our collaborative involvement.” (2) “Didn’t have a choice. And that’s the truth, when Dr. X went, and I think it was a Monday morning she was there when [Name] got there and she came back to the clinic and said, ‘We’re going to have to do it,’ and I said, ‘Okay.’ I mean we all have to take orders and directions from somebody.”

Code: Belonging to the HDC
Details: This gets at the crux of the theory of perceived organizational support; to the extent that a middle manager feels like he or she belongs to the HDC, I hypothesized that he or she will feel the need to reciprocate with commitment to implementing the HDC.
Example: “Oh definitely. Not only here at our local level but at our national level as well. I became very involved with the individuals from other health centers not only in our local Midwest area but also nationally. It was quite enjoyable to meet people from California or Nebraska and to see what challenges they had and also to share ideas on some of the things
that they’d found to be successful as well as us sharing our ideas with them as well and
everybody became very close and like I said, here locally at our own health center level, we
all became a team. It wasn’t just a team that met once a week but everyone was involved,
everyone had responsibility and yeah, it was one thing that brought the staff together and
everyone was involved so.”

Code: Common understanding
Details: This relates to a specific question that I asked at the end of the interview about
metrics for success related to the HDC. I asked whether the goals of the HDC were clear to
the middle manager, and then I asked whether everyone in the organization understood those
to be the goals/metrics for success.
Example: “I would say that they all knew that we were working on diabetes, a chronic
condition and that we were really big on foot exams and self-management goals and maybe
A1Cs. I think ninety percent of them would say yeah they track the A1Cs on that.”

Code: Financial resources
Details: This is one of the IP&Ps (key independent variables). It relates to any funding that
was available to the middle manager for the HDC.
Example: “The DEMS and the CVDEMS was a download system, that’s why I had to have
permission to load it onto my computer at the company. The events, they paid for them. All
the clinic managers have their American Express through the company, and I went with that
and turned in receipts for the expenditure for that. And that was it, they paid for it.”

Code: Human resources
Details: This is one of the IP&Ps (key independent variables). It relates to any staff who
participated in the HDC or somehow influenced the middle manager’s experience in
implementing the HDC. This can be straightforward identification of staff related to the
collaborative and/or discussion of importance of human resources.
Example: “Dr. X had a really hard time with it at the beginning, just like most providers, she
felt like she was being told what to do, how to take care of her patients. Even though that
wasn’t what it was saying, it was just saying based on information that the Institute of
Healthcare Improvement found is that the patients do better by monitoring more often, being
sure they’re on aspirin, whatever that is that’s on that collaborative event. And it took her a
while to finally realize, and how she has a fit when we don’t do it.”

Code: Implementation effectiveness
Details: This is the dependent variable. This can refer to metrics for success for the HDC,
systems being in place that reflect the fact that the HDC has been properly implemented, or a
middle manager’s sense of the efficiency or effectiveness of their health center’s processes.
For example, diligent data collection signifies implementation effectiveness. This is
distinguished from innovation effectiveness, which is an outcome of implementation
effectiveness and refers to positive outcomes associated with the effective delivery of the
innovation.
Example: “We got the point where we felt like, “We have a handle on our population,” we
knew what the migrants were going to do, now we had to determine what steps we wanted to
do next. Because we found out when I got that patient list and actually started doing chart
audits for the items that they were looking for, like hemoglobin A1c and lipids and depression screenings. It is amazing. That was the first time that was so amazing that maybe we really weren’t doing things correctly because we had many one hemoglobin A1c in two years.”

Code: Incentives
Details: This is one of the IP&Ps (key independent variables). This relates to any rewards (public recognition, financial incentives, career promotion opportunities, compensation time) that were offered to middle managers in exchange for their participation in implementing the HDC.
Example: “It would have been very nice to have some type of incentive or some type of, in all honesty, it would have been nice to just have a, ‘Thank you for doing this.’”

Code: Interest/identification with HDC (financial resources)
Details: This is a proposed mediator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC.
Example: “Well I think as far as our ability to do some of the things, like I said the hemoglobin A1C yeah we could have just sent them to the lab and had those done but I don’t think we would have been as successful in educating the patients, therefore, you would not have seen the outcomes that we did so some of the things that we were able to purchase truly determined our outcomes.”

Code: Interest/identification with HDC (human resources)
Details: This is a proposed mediator of the relationship between access to human resources and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC. For example, interactions with HDC staff may have increased middle managers’ interest/identification with the HDC.
Example: “Well, there was enough years in between the beginning of the collaborative and working the years on the collaborative and then the hire of Dr. X so it didn't affect me. [Inaudible 1:00:57] other than I'm just happy that the patients [inaudible] we were going to have somebody there fulltime and be able to see the patients that needed to be seen. So, I can't say that it upset me or gigged me one way or the other.”

Code: Interest/identification with HDC (incentives)
Details: This is a proposed mediator of the relationship between incentives and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC.
Example: “Oh I think that just reinforced your motivation to continue. Like I said, the outcomes were very important. I think that was first and foremost but any additional recognition or a pat on the back, the always makes you feel better about what you’re doing I think and that made you get in there and be even more involved in trying to come up with even more ideas or ways of helping patients to improve.”

Code: Interest/identification with HDC (performance reviews)
Details: This is a proposed mediator of the relationship between performance reviews and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC.
Example: “I think it probably reinvigorates, because she thinks I’m doing a good job with this, so I want to continue to do a good job. Does that make sense?”

Code: Interest/identification with HDC (local social network involvement)
Details: This is a proposed mediator of the relationship between local social network involvement and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC.
Example: “If they had not done it, I would have felt like we weren’t being basically the big team so the fact that they were as interested and engaged as the primary care providers down here definitely influenced my enthusiasm about the program.”

Code: Interest/identification with HDC (top managers’ support)
Details: This is a proposed mediator of the relationship between top managers’ support and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC. I ask a specific question about it.
Example: “When my boss announced the (HDC) meeting at the all staff meeting, I felt like, ‘yeah, this is something important.’”

Code: Interest/identification with HDC (training)
Details: This is a proposed mediator of the relationship between access to training resources and middle managers’ commitment to innovation implementation. It relates to how the IP&P affected the middle manager’s interest or identification with the HDC.
Example: “I think it was motivational seeing other teams across the nation, what they were accomplishing, and it also gave you a lot of ideas about what could be implemented within your organization.”

Code: Internal attribution
Details: This is a code that I introduced when I noticed that middle managers often attributed their commitment to HDC implementation to their personality type or values system.
Example: “I think a lot of it’s my personality, also my upbringing. I was always an old fashioned type person, and I was raised that if you’re going to take somebody’s money for pay, you better earn it. And they’re the ones giving you the money, so you better do what they say.”

Code: IP&P importance ranking
Details: This refers to the IP&P that middle managers identified as most influential in their commitment to innovation implementation.
Example: “I appreciated the support from higher-ups. I hated it when I was not, when I'm independent and I'm just treading water. So, the support and encouragement is helpful and the educational opportunities.”

Code: Job satisfaction (financial resources)
Details: This is a proposed mediator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “I got frustrated with the lack of resources available to be able to implement true PDSA cycles, but my overall job satisfaction I don’t think was altered by it.”

Code: Job satisfaction (human resources)
Details: This is a proposed mediator of the relationship between access to human resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “I was going through a lot of employee turnover at the time for whatever reason. And there was a point where I thought, ‘I’m going to go look for another job because I can’t do this. I can’t be unhappy coming to work every day.’ That’s just something I can’t do. I can put on an air here and be real happy and friendly, but I have to be able to get up out of bed and say, ‘Oh goodie, I’m going to work.’”

Code: Job satisfaction (incentives)
Details: This is a proposed mediator of the relationship between incentives and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “I went through a period of where I was questioning if I wanted to continue to work so hard on a job that I made so little money and so little appreciation from the top.”

Code: Job satisfaction (performance reviews)
Details: This is a proposed mediator of the relationship between performance reviews and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “And then I had a surprise visit by administration and was told some things and was given an option, either I can improve or not improve. So then I had to do some soul-searching, I had to really look at things. I thought, ‘This is not me to be like this,’ because I’m not. ‘This is not right of me to put people through so much misery and hate. It is not beneficial to the patients at all,’ and I’ve always been a nurse and patients are always number one. So I had to do a lot of soul searching”

Code: Job satisfaction (local social network involvement)
Details: This is a proposed mediator of the relationship between local social network involvement and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “maybe if they hadn’t of participated it would have been down to an A [instead of an A+ job rating].”

Code: Job satisfaction (top managers’ support)
Details: This is a proposed mediator of the relationship between top managers’ support and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: ‘I’ve always liked my job, but like I told the administration now, I said, this is the honest truth, ‘I’ve always loved nursing, and then I’ve always liked my job. But this is the time I love my job.’”

Code: Job satisfaction (training)
Details: This is a proposed mediator of the relationship between access to training resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s job satisfaction.
Example: “I guess I felt more motivated from camaraderie with others. That would enhance it [job satisfaction], yeah.”

Code: Managing HDC staff
Details: This is a subcode for middle managers’ commitment to HDC implementation. I made it a separate code because it was such a common expression of how middle managers demonstrated commitment to implementing the HDC – figuring out ways to get providers on board, rallying the troops, handling staff disputes, etc. It refers to HDC staff management only within middle managers’ facilities; it does not refer to middle managers’ interactions with HDC staff in other facilities – even other facilities within a middle manager’s health center. Interactions with HDC staff in other facilities relates to local social network involvement.
Example: “Did some education with the staff to make sure that they were reviewing it to check when the last A1C was done and what it was, to see whether it needed to be done again or in six months; and education with some of the providers too, just to make sure that they were paying attention to path labs a little better than they were before.”

Code: Middle manager commitment to HDC implementation
Details: This is the key variable (dependent for analysis of effects of IP&Ps and independent for analysis of effect on implementation effectiveness). It is any expression of what a middle manager did to demonstrate commitment to HDC implementation (e.g., creating reports, using IT, etc.) or how the middle manager felt about HDC implementation.
Example: “We did not have a computerized system to help track or develop this program that we need to do. So it fell into my lap.”

Code: Mood (financial resources)
Details: This is a proposed mediator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.
Example: “I think it was exciting to get the instrument, just to be able to have that extra tool to watch the lab results, and they have them immediately as opposed to having to wait and then who knows who looks at them. It was just easier for documentation too, because then you could go to our book and write down so and so's A1C was this. Then you could put it on the flow sheet and it was easier to have our reports to get the numbers from our reports for the collaborative. So it was exciting to have it.”

Code: Mood (human resources)
Details: This is a proposed mediator of the relationship between access to human resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “I was making a very small amount of money at the time and no support from the administrative staff. None of any kind. Nothing. And that was frustrating.”

Code: Mood (incentives)  
Details: This is a proposed mediator of the relationship between incentives and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “It was but then on the other hand it was very overwhelming and taxing sometimes especially when other providers were getting compensation when I wasn’t.”

Code: Mood (performance reviews)  
Details: This is a proposed mediator of the relationship between performance reviews and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “It made me feel good to hear that I had been doing a good job.”

Code: Mood (local social network involvement)  
Details: This is a proposed mediator of the relationship between local social network involvement and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “I guess sometimes it was great to hear if their numbers were going down or their referral numbers were going up, but then again, sometimes it was I wish I had the time to do what you’re doing to make my numbers do that one way or another. But it was still great to know that they were having success with the things that they were doing.”

Code: Mood (top managers’ support)  
Details: This is a proposed mediator of the relationship between top managers’ support and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “But the biggest time when it really affected me was when we all had to go to the collaborative events, we were required to go to these events, and the other CHCs in Arkansas would go and their administrative staff would be there with them, and they would have additional staff to do the work or they would have additional pay to do all the work, and then there I was with neither one of those and no administrative staff support. Those events is what made me the most disheartened, I guess it would be. I would be so disheartened that I didn’t have administrative staff that supported it.”

Code: Mood (training)  
Details: This is a proposed mediator of the relationship between access to training resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s mood.  
Example: “there was a lot of trips and stuff that we went on too, that the collaborative funded and so we travelled a lot for a good couple of years shortly after the whole start of it. So you
would go to those and then come home really pumped up and want to do things and then, again, fall back into the need for staffing and that kind of stuff.”

Code: Organizational size
Details: Organizational size refers to the number of patients or scale of operations (e.g., number of facilities) in a middle manager’s health center.
Example: “Well, as we grew and, again, we’ve tripled in size over the last ten years or so, we just didn’t have all these sites now.”

Code: Patient outcomes
Details: I found that many middle managers cite patient outcomes as a big factor in determining their commitment to innovation implementation: When they started to see patient outcomes improve (e.g., decreased hemoglobin A1Cs) subsequent to HDC implementation, it increased their commitment. Since decreased health disparities are the main goal of the HDC, improved patient outcomes really represent innovation effectiveness. This is distinguished from implementation effectiveness, which is an antecedent of innovation effectiveness and refers to the presence of the systems necessary to deliver the innovation.
Example: “You know, way back when I first started, I think our average A1c was 13, 14, maybe. Now it's -- it had gotten to 7.3, but now I think it's like 7.6, so I see the results of it.”

Code: Performance reviews
Details: This is a key independent variable in the regression of middle managers’ commitment on IP&Ps. It can refer to formal or informal discussions of middle managers’ implementation-related performance. I ask a specific question about it, although many times middle managers suggested that they had “good communication” with their supervisors and got continuous feedback on their performance. I coded this informal version of performance reviews, too.
Example: “Q: Did you ever receive any feedback during those performance evaluations on your collaborative related performance? A: Yeah, I believe I did because it was always part of my goal to get my CDE and that kind of stuff that being part of the goal in my evaluation then they would address my involvement in the collaborative.”

Code: Local social network involvement
Details: This is a key independent variable in the regression of middle managers’ commitment on IP&Ps. Many middle managers’ health centers were comprised of several facilities. I ask a specific set of questions about whether other facilities in the middle manager’s health center also participated in the HDC and, if so, how that influenced the middle manager’s commitment to implementation.
Example: “- but we’re located in a migrant rest stop, so we deal with migrant farm workers, seasonal farm workers, we also have 50% of a Hispanic population here in our clinic. The other clinics have no Hispanics, no migrants; one clinic has 100% retirement age. So it’s just kind of a diverse difference. I think we can support each other as team leaders, but I don’t think it’s - I think they had to tailor it to their own area.”

Code: Stress (financial resources)
Details: This is a proposed mediator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “Well I think that’s why they’ve moved through some of the things that they have done as far as slaying us and then now changing how we put in our salaried hours and putting us on productivity things. It just continually increases the stress. It seems like every six months there is another stressor and another thing to stay after hours to see that it is documented and in the system and it is a lot of extra time and work and the collaborative.”

Code: Stress (human resources)
Details: This is a proposed mediator of the relationship between access to human resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “[Having access to human resources made me feel] that actually I was catching up and maybe we could send timely reminders and we could get people in that hadn’t been in for a while. So, it did make me feel like I was less stressed because those kinds of minutia things were being done. But, you know, the devil’s in the details. You’ve got to have that stuff”

Code: Stress (incentives)
Details: This is a proposed mediator of the relationship between incentives and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “A: I guess where I live and I’m paid well so but my stress level is high. Q: And those pay increases and acknowledgment from top managers hasn’t done anything to kind of moderate that stress level? A: No. If anything I think that they feel that you’re compensated so carry on.”

Code: Stress (performance reviews)
Details: This is a proposed mediator of the relationship between performance reviews and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “First of all, I don’t even get it [performance review] on a yearly base. I don’t even know from one year to five years from now what’s happening, and then all the sudden I get a low evaluation? Why?”

Code: Stress (local social network involvement)
Details: This is a proposed mediator of the relationship between local social network involvement and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “Well, it definitely primarily and predominantly alleviated stress because of shared workload and so neither [Name] was crushed nor I so it relieved stress.”

Code: Stress (top managers’ support)
Details: This is a proposed mediator of the relationship between top managers’ support and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “But did I feel more stressed because it’s not being identified in some form by administration? Yes. And I even had to tell, the staff would ask why are we doing this, at the beginning, and then the only answer I could tell them is because we have to. It’s not a choice. We’re going to do it.”

Code: Stress (training)
Details: This is a proposed mediator of the relationship between access to training resources and middle managers’ commitment to innovation implementation. It refers to how the IP&P affected the middle manager’s stress level.
Example: “Because it was overwhelming. That first training was too much. I think they learned from that, because I don’t believe they did another great big one like that. That was huge. That was a huge, too many people, too much learn at the beginning, and I think they tried at the next, the next one we went to was much smaller, and the next time when they did phase three’s, I think they cut it down even more, it was smaller.”

Code: Top managers’ free will (financial resources)
Details: This is a proposed moderator of the relationship between access to financial resources and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “And then they, Hampton, our administration, knew they were going to have to start buying more lab equipment, more DCA 2000’s or Cholestechs for cholesterols. So it was a money factor, a time factor, and finally, when they did, then we were able to expand to one clinic and we just stayed with that one clinic forever and then finally they let me expand to another clinic. It just took time. But they were the ones that said yes or no to expanding and when.”

Code: Top managers’ free will (human resources)
Details: This is a proposed moderator of the relationship between access to human resources and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “It took about six, nine months before I could get the third one [support staff] on, and then suddenly, of course, Bureau of Primary Health Care announced, ‘Yes, the collaboratives will be part of their evaluation tool of all CHCs,’ and then everybody else [top managers] came onboard all at once.”

Code: Top managers’ free will (incentives)
Details: This is a proposed moderator of the relationship between incentives and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “I know our diabetes program brought a lot of recognition to our community health center. It really did. Q: And was that, do you think, the driving force behind the leadership team’s desire to have you speak so often about the Collaborative [public recognition]? A: I do believe so.”

Code: Top managers’ free will (performance reviews)
Details: This is a proposed moderator of the relationship between performance reviews and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “They [performance reviews] were a necessary evil, I guess.”

Code: Top managers’ free will (top managers’ support)
Details: This is a proposed moderator of the relationship between top managers’ support and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “I can't say that he was unsupportive, but way back in the beginning, but I think I've seen more support now that he’s been involved in so many and the way things have worked out. Q: Why do you think that is? A: I don't know. I guess the only thing I can think of is dollar wise.”

Code: Top managers’ free will (training)
Details: This is a proposed moderator of the relationship between access to training resources and middle managers’ commitment to innovation implementation. It refers to whether the middle manager believes that the top manager wanted to provide the IP&P or whether the top manager was obligated to do so (e.g., by the Bureau of Primary Health Care).
Example: “I think it was more at that point, not yet, they weren’t going to be evaluated on it, but that’s where Bureau Primer Healthcare was looking at it, and I think it was a political, I hate to say that, but I really do, I feel like it was a political move [to send staff to training].”

Code: Top managers’ support
Details: This is a key independent variable of the regression of middle managers’ commitment on IP&Ps. It refers to any expression of support that top managers in the middle managers’ health centers gave for the HDC.
Example: “At the beginning I would go in [to top managers] and say, ‘You all do realize how much work this collaborative is?’ and nobody else was in it in the company, so, ‘Well, we’ll get around to it.’ Okay. And then I’d say again, another couple of months down, ‘You all do understand, when we spread this collaborative, it’s a lot of work, a lot of work?’ And of course, they never realized it.”

Code: Training
Details: This is a key independent variable of the regression of middle managers’ commitment on IP&Ps. This could involve anything from the national or regional HDC meetings that the Bureau of Primary Health Care put on to IT training within the middle
manager’s health center or any training that the middle manager or his or her staff received to make implementation easier.
Example: “I don’t feel like everybody got a good education level of what it is and how it is. I think all they really understood, because I got to go and talk to them and teach them one hour. They just know they have to do certain lab work, they have to do certain things and that’s it. I don’t think they understand what the purpose of the collaborative was. It wasn’t necessarily that alone. Yes, it is to monitor the patient better, but it also is to educate the patient and empower the patient to overcome their disease process, if you don’t understand it all. But anyhow, yeah.”

Code: Turnover
Details: This is a control variable that refers to staff in the middle manager’s health center leaving the health center. It could be previous middle managers, top managers, providers, etc. This can refer to a straightforward identification of turnover, like the example below, or discussion of the implications of turnover.
Example: “That administration is no longer with us. Nobody from that administration is with us any longer.”
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