LEADING PEOPLE - MANAGING ORGANIZATIONS: CONTEMPORARY PUBLIC HEALTH LEADERSHIP

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LEADING PEOPLE - MANAGING ORGANIZATIONS: CONTEMPORARY PUBLIC HEALTH LEADERSHIP

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In this Research Topic, we provide a comprehensive overview of current public health leadership research, focusing on understanding the impact of leadership on the delivery of public health services. By bringing together ground-breaking research studies detailing the development and validation of leadership activities and resources that promote effective public health practice in a variety of settings, we seek to provide a basis for leading public health organizations. We encouraged contributions that assess the effectiveness of public health leaders, as well as critical discussions of methods for improving the leadership of public health organizations at all levels. Both ongoing and completed original research was welcome, as well as methods, hypothesis and theory, and opinion papers.

The effective practice of public health leadership is a key concept for public health practitioners to clearly understand as the 21st century unfolds. Following the significant lapses of leadership in the for-profit world, leaders in governmental and not-for-profit agencies are required to learn by their failed examples. A major task facing all current and prospective public health practitioners is developing the required leadership skills in order to be effective twenty-first century leaders. As a consequence of the rapidly evolving health of the public, as well as the development of the discipline and practice of public health, understanding the principles and attributes of leadership are now required of all public health practitioners.

Leadership can be described in a variety of ways. Leadership in public health requires skillful individuals meeting the health challenges of communities and the population as a whole.

Leadership may be defined as a process that occurs whenever an individual intentionally attempts to influence another individual or group, regardless of the reason, in an effort to achieve a common goal which may or may not contribute to the success of the organization. Thus leadership is a process involving two or more people. The nature of leadership is an important aspect of the concept as a whole. Submissions relating public health leadership to the management of public health organizations were welcomed. This Research Topic provided the opportunity for authors to consider the concept of leadership from a variety of approaches. Original research papers considering a variety of leadership theories provide methodological approaches to the topic. Hypothesis and theory papers provide the basis for application of leadership to public health practice. Opinion papers provide the opportunity to develop thinking concerning practice of public health leadership.

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Original Research

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EDITORIAL
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Editorial: Leading People – Managing Organizations: Contemporary Public Health Leadership

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Effectively leading people engaged in the practice of public health has never been more critical than in the early years of the twenty-first century. Likewise, effectively managing the organizations in which these individuals practice the various professional disciplines of public health has become increasing important and difficult. Taken together, leading the people and managing public health organizations requires well educated and appropriately trained public health leaders and managers. Although leadership is often viewed as one of the key attributes of management, not every great manager will be a great leader and vice versa. While some leaders may be born with the inherent skills to lead, most effective leaders develop the requisite skills through education, additional training, and practice.

Our aim is to focus the attention of public health practitioners on the importance of effectively leading public health organizations. Public health managers should recognize that their most valuable resource is the people they lead. The articles comprising the eBook on Leading People – Managing Organizations is composed of articles expressing the opinion of their authors of the need for effective public health leaders; perspective articles establishing their authors' understanding of how leadership may be applied in various situations; methods articles that demonstrate how public health leadership may be applied, and original research articles that establish the role of public health leadership research studies.

OPINION

Baroff, Yphantides et al., and Van Gorder express their opinions on the need for effective public health leadership based on their personal experiences in public health practice. Baroff (1) details the development of her career in leading organizations, as well as the difficulties she encountered in doing so. Her opinion clearly indicates the need for persistence and self-awareness for all leaders. Yphantides et al. (2) issue a call for public health leaders to develop new leadership skills in order to implement and sustain change within the public health organizations they lead. Their article summarizes their understanding of the need for new competencies that are essential for moving the public health system forward in the twenty-first century. Van Gorder (3) calls for public health and healthcare leaders to work together in order to build strong collaborative models for the future.

PERSPECTIVE

Rabarison et al. (4) provide their perspective on utilizing Situational Leadership® as an effective leadership process in developing public health agency accreditation in the USA through the national voluntary public health accreditation process. Utilization of this contingency theory of leadership allows public health practitioners and staff members to develop the knowledge and confidence required to meet the standards of the Public Health Accreditation Board. Carman (5) provides a

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perspective on the impact that public health agency and academic institutional partnerships have on the public health accreditation process in the USA. She identifies the opportunity for academic institutions to provide consultative services to public health agencies in an effort to arrive at a successful conclusion to the accreditation process. Carman (6) further provides an interesting perspective on the application of leadership and followership theories to voluntary public health agency accreditation in the USA. She proposes that "teamship" rather than leadership or followership is required in order to create an accreditation readiness team prepared to guide a local health department through the accreditation process. Rabarison et al. (7) provide an interesting perspective on the need for evidence-based public health practices and the resulting decision making by public health leaders as they consider the impact of reduced funding and constrained budgets. They contend that population health is optimized as public health leaders identify, measure, and compare the activities being conducted by public health agencies with their resulting impact, scalability, and sustainability. Public health leaders need to conduct economic evaluation of public health activities in order to make appropriate decisions affecting the health of the population being served. From an international perspective, Negandhi et al. (8) identified interdisciplinary leadership competencies among health practitioners, such as self-awareness, vision, self-regulation, motivation, decisiveness, integrity, interpersonal communication skills, strategic planning, team building, innovation, and functioning as an effective change agent. Their pilot study in India developed a training model for building such skills through interdisciplinary workshops with the objective of incorporating such training in the medical, nursing, and public health curricula. They propose through the use of transformative learning that leadership skills be incorporated into healthcare professional training in a variety of national contexts.

METHODS

Marckmann et al. (9) provide a systematic framework for putting public health ethics into practice. Public health practice requires a different approach to ethical concerns than that of traditional biomedical ethics. They propose two necessary components to practicing public health ethics: a set of normative criteria that are based on an explicit ethical justification and a structured methodological approach for applying these criteria to specific public health issues. They recommend that their framework be put in practice in public health settings in an effort to determine its practical application.

ORIGINAL RESEARCH

A group of four original research articles rounds out the research topic. In an investigation into the impact of emotional intelligence on the conditions of trust found in a public health setting, Knight et al. (10) measured emotional intelligence including stress management among supervisors in the Kentucky Department of Public Health (USA). The study found significant positive correlations between supervisors' stress management and the staff members' trust or perception of the supervisors' loyalty, integrity, receptivity, promise fulfillment, and availability. Findings such as these provide the requisite tools to provide training opportunities related to emotional intelligence and trust in organizations. In a two-part article, Carlton et al. (11, 12) consider full-range public health leadership as a useful construct for considering the complex challenges faced by effective public health leaders. They provide both a quantitative as well as a qualitative analysis and synthesis utilizing transformational leadership as a model for their study. They determined that transformational and transactional styles of leadership need to be balanced in order to provide effective leadership to public health organizations. As a result, both approaches have beneficial results depending on the context or situation in which they are utilized. When leaders lead by example and are collaborative, transformational leadership is effective. However, there are occasions when a transactional style of leadership is required to assure adequate performance levels and the accomplishment of certain tasks. Jadhav et al. (13) studied openness to change on the part of local health department leaders (USA). They demonstrated that leaders had relatively high openness to change scores based on their understanding of the characteristics of an innovative strategy. Their analyses found important relationships between the characteristics of the leader and those of the public health agency on the leader's openness to change.

SUMMARY

The articles composing the *Leading People – Managing Organizations* research topic approach effective public health leadership from a variety of viewpoints. Together these opinion, perspective, method, and original research articles point to the need for further development of public health leadership in the twenty-first century. Utilizing diverse leadership theories or models, as well as considering the needs expressed in the opinion and perspectives articles by authors engaged in public health practice and applied public health services research, additional research is needed to develop evidence-based approaches to the practice of effective public health leadership in the twenty-first century.

AUTHOR CONTRIBUTIONS

JH wrote the original draft of the article. EC and EJ revised and corrected the original draft.

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OPINION
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My leadership engine

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As a senior healthcare executive and fellow in the American College of Healthcare Executives (ACHE), I am often asked by junior colleagues how I became a leader. Since many women administrators still encounter difficulty in breaking through the glass ceiling to the executive suite, gender equity and personal values are frequently central to my narrative. Although more recently characterized as a labyrinth, which is neither simple nor easy to navigate, the glass ceiling, a visible, but clear and impenetrable barrier continues to prevent women from executive advancement (1). Thus, for many female leaders, negotiating a path to an executive position requires persistence and self-awareness. In describing my own career trajectory, which culminated in a position as a Chief Operating Officer, I emphasize the useful lessons which shaped my leadership behavior and the learnings that can serve as helpful hints for early careerists.

Since my career path spanned work in a local health department, clinics, hospitals, medical groups, and health plans, I frequently address the mix of agencies by highlighting my dual interests in macro policy development and micro level operations. As a female senior executive, faced with countless gender expectations, I stress the critical importance of promoting women into leadership roles. Within the hospital industry where women comprise more than 75% of the workforce, yet men are 74% of the chief executives; the opportunities for women's advancement to the c-suite remain limited (2).

Early in my work-life, though there was an occasional nun or former nurse who stood at the helm of a large healthcare organization, most women leaders were clustered in department head or senior leadership roles. The executive suite was not entirely restricted; rather, women were underrepresented in general management and tended to fill nursing, planning, and marketing roles, not traditional pathways to executive advancement (3). This double standard played out on a daily basis, when male colleagues were praised for bold, visionary thinking, while women were chided for aggressive outspokenness. As a result, when it came time for CEO recruitment, boards of directors and other governing bodies tended to hire people who looked and spoke like them, typically meaning senior white males. Promotional opportunities that did exist were relatively few, and often demanded frequent moves, long-distance commuting, or family re-location, which were difficult for two career couples.

Twenty five years later, despite the progress made in educating and promoting women, this longstanding imbalance endures. Recent research indicates that men advance to hospital CEO positions at twice the rate of their female counterparts (2). In addition, since women constitute only 17% of top US corporate boards of directors, interviewing with male dominated executive boards continues to challenge women today (4). This stark reality contrasts with the perception held by many that because discrimination based on gender is illegal, the issue of gender bias or gender equity no longer exists. In fact, some men even claim that "although things might have been bad in the past, everything is fine now" (5).

Three decades ago, in nearly every healthcare setting, executive women mentors were either unseen or unknown. Consequently, my female colleagues relied upon our male bosses or female peers for career advice. While this informal support was helpful, mutual aims of professional advancement and work-life balance remained complex and unresolved.

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By choice, necessity, and a commitment to lifelong learning, I pursued self-reflection as a means to better understand the challenges, situations, and opportunities I encountered as a woman healthcare professional. To assist leaders at all levels of responsibility, and to examine their philosophy, values, and behavior, *The Leadership Engine*, a book by Noel Tichy, Professor at the University of Michigan School of Business and former head of General Electric leadership training, provides a useful tool called, "the Teachable Point of View" (6).

Deceptively simple, this four step tool charts key nodal or life events on a timeline with positive, affirming experiences shown above the line, and challenges, failures, and unhappy incidents recorded below. The second step involves reflecting on these events relative to both favorable and disappointing outcomes and searches for recurring themes and repeated circumstances. Step three considers the principles and lessons learned and how these events influence leadership. The final step demands careful reflection and candor, sharing the self-assessment with others.

In applying this approach, six themes emerged in my timeline including: Projection, Preparation, Perseverance, Parity, Proof, and Play. Together, these six Ps constitute the fundamentals that fuel my leadership engine and serve as lessons learned that ultimately guided my leadership behavior. As such, they may provide a helpful roadmap that can be emulated by others.

Projection

The first theme that resonated throughout crucial points in my life, correlated with my improbable career aspirations in espionage, which stemmed from my study of Russian history and language, and my fondness for reading mysteries. Projecting myself into the plotline in an effort to solve the problem presented, I also served as the "resident office futurist," developing long-range plans, and forecasting business threats and opportunities. Addressing tough leadership questions with honesty and authenticity, and understanding the needs and concerns of others with a commitment to investigate and follow-up were also important precepts. Projection also called for creating an aura of poise and calm in the place of nervousness that might arise in addressing a large audience of professionals.

Futurist that I am, as a leader, I still face the never-ending trial of paying attention to what is in front of me, "staying in the moment." Though much of my projection centered on strategic analysis and contingency planning, my propensity to look ahead may have obscured choices that were right before me and resulted in a missed learning opportunity. In the end, most decisions are a mixed blessing carrying both advantages and disadvantages.

Preparation

The second theme powering my nodal event timeline is *preparation*. This need for readiness and implicit desire for control is, in part, a reaction to the sex-role stereotyping I encountered as a young girl. At that time, I learned that to succeed as a female in school, I had to work harder.

While performing as a top student and high achiever was not a struggle, it did require daily diligence and effort. Driving me to complete work in advance, practice everything, and rehearse repeatedly, I sometimes arrived in the classroom, office, or event over-prepared. Ironically, this careful planning often set the standard and modeled the way for others to follow. Given the inevitability of unforeseen mishaps, this groundwork allowed for flexibility and the freedom to improvise when necessary. Whether at work or play, drafting a presentation, rehearsing a speech, or running a marathon, formulating a game-plan in advance, and executing it in a step-wise fashion remains a core value and another lesson learned.

Perseverance

A manifestation of my "stick-to-it-iveness," and the third element in my leadership engine, means that I survey the long road ahead, forge a plan, and progress forward; even on the occasion when this doggedness proves a detriment. Since every strength, when taken to an extreme, can become a weakness, learning to temper my tenacity earlier in my career would have been helpful. In retrospect, there were times when taking a less far-reaching position might have been a more productive stance; particularly, when the progress of team goals was impeded by my persistence or reluctance to yield.

Due to a traumatic life event, which occurred in my mid-twenties, my tendency toward perseverance was really deep-seated in fear. From this pivotal experience, I adopted a new mantra of "feel the fear and do it anyway." Ultimately, this incident with its polar opposite emotional amalgam of fear and courage led to a westerly migration for graduate school, which was not only liberating, but also served as the anchor for my subsequent family life and healthcare administration career.

Parity

Synonymous with equity and fairness, *parity*, component number five, functioned as the primary catalyst for my active participation in the women's movement as a feminist and believer in equal opportunity. Growing up in the South, in a Jewish home with an appreciation for the importance of justice and mercy, at a young age, I became aware of racial, religious, and gender discrimination. Observing its expression in my youth and college years, I developed a thick skin and fighting attitude toward inequality. I warmly recall protesting in national marches on behalf of women's rights, and donning a suffragette ensemble to demonstrate at one state legislature for the Equal Rights Amendment. Witnessing injustice not only reaffirmed my advocacy for the underdog, but also strengthened my determination to treat all individuals as equals and view subordinates, peers, and managers as customers deserving of courtesy and mutual respect.

Proof

Another predominant feature of my teachable point of view represented achievement, driving for results, and winning of recognition. Integral to the development of self-esteem, this need balanced the hunger for pride with the call for humility. While my competitive nature to prove my worth was reinforced at home and at school, if unchecked, it could create friction in the workplace by appearing too self-serving.

Despite the satisfaction I experienced from knowing that I was smart, I had enough self-awareness to recognize that I was less than perfect. Nevertheless, outside the office, I did excel as a member of the ACHE national Board of Governors. In this role, I visited more than eight states and met with other healthcare executives for mentoring, public speaking, and continuing education. Prior to advancing to the Board, I served as an elected leader for a women's healthcare administration network and helped merge this organization with a local ACHE affiliate. When the local ACHE Regent unexpectedly moved out of the area, I was asked to step in as Interim Regent. This progression was followed in short order by election to Regent and an appointment as Governor for the Western Region of the United States. After my 4-year term on the Board concluded, I also served on the National Nominating Committee helping to choose the slate of future officers, and on the Chapters Committee which created the ACHE unified membership structure.

Play

The last element of my six Ps equated to never surrendering my leisure time. Though I disciplined myself early on to finish assignments, I always made time for fun. Whether reading, walking, shopping, running, antiquing, writing, or watching old movies, reserving time to play was a priority. Even at the office where critical decisions were debated for hours, I injected lightheartedness into serious tasks. Once I choreographed a live auction using play Monopoly money while department managers bid on gift baskets for prizes tied to budget targets.

As I contemplate my own leadership engine and the lessons learned from my six Ps, I am reminded of both successes and disappointments as the price we pay for seeking challenging goals. On the one hand, though receiving frequent acknowledgments as an outstanding visionary leader, when I sought career advancement, internal promotional policies requiring geographic re-location frustrated my multiple attempts to break through the shatterproof, shock-resistant, Plexi-glass ceiling. Only after leaving a job of 20-plus years in one integrated health system and joining another, did I advance to the executive suite. Despite my hard work to lead a financial turnaround in a failing business unit and pilot an innovative project that achieved national recognition, I was laid off twice in two separate administrative restructures. Now, I am applying my leadership skills to building bridges across agencies and improving operations in the nonprofit arena.

Thus, with my six Ps inter-weaving future planning, doing homework, sticking with it, promoting fairness, striving for results, and taking time out for renewal, my leadership journey continues. As I move forward on my own path, I will also continue to advocate for the advancement of women leaders. With gender equity in executive leadership, a business and moral imperative, all senior leaders must understand the issue and act to mitigate the inclination to bias and unfairness. To further collective progress, executive women at all levels of authority must take the initiative to mentor others. Employers need to embed professional development training, flexible work schedules, well-defined advancement criteria, and formal succession planning into the fabric of their organizational cultures. Educators should add personal values and professionalism into academic training, and create course offerings that assist all leaders to be more effective speakers and advocates on committees and workgroups. Ultimately, governing boards must display the courage to hire executives that look, think, and behave differently from the comfort-zone archetype of "male, pale, and stale" (7).

Checking in at a mid-west hotel, a desk clerk once glanced at my ACHE Governors badge, and asked if I was a Democrat or Republican? Struck speechless, but always ready for a bit of fun, I joked that I was an Independent from the State of Grace! So intending humor, maybe on that day, between being a former COO and a State or ACHE "Governor," I had finally reached the pinnacle of my career. Perchance that glass ceiling was not so unbreakable after all!

I highly recommend the use of *The Leadership Engine* for all aspiring young executives, both men and women alike. Utilizing the four steps of "The Teachable Point of View," charting nodal life events and reflecting on lessons learned can offer early careerists, an opportunity to assess current status and map a clearer pathway to success.

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Leadership in public health: new competencies for the future

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In *Contemporary Public Health*, Keck, Scutchfield, and Holsinger call for changes in vision among those leading the evolution of healthcare from individualistic to community-wide approaches to improve health status (1). Having new vision is necessary but not sufficient; new leadership skills are also needed in order to implement and sustain change. This article summarizes our thoughts about new competencies essential to moving our community's health system to meet the demands of public health in the twenty-first century.

Since the start of the New Millenium, "public health" has emerged from a behind-the-scenes discipline to a widely recognized leader of community and global initiatives. Concurrently, the healthcare delivery system has embraced "population health" as fundamental to achieving success in its traditional role of caring for individuals (2). These trends have challenged those leading both sectors and created a context that promotes innovations in collaboration. The County of San Diego is an excellent example of the successes and challenges of such collaboration. Those leading new alliances and partnerships have had to be nimble, courageous, and innovative. They have had to learn new content and develop new leadership skills.

San Diego's health environment has a wealth of proficient leaders and highly skilled managers, as well as strong universities with programs in all clinical professions, public health, and healthcare management and policy. This article combines the insights of three senior leaders on the changes required in our own leadership based on the evolution of the environment, suggests the "competencies" required to deal with those changes, and recommends how these competencies can be taught and/or learned. Our comments are framed in the academic jargon of competencies, include "knowledge, skills, and attitudes," but recognize that, in the practitioner's world, these competencies are viewed as practical techniques for orchestrating change and achieving performance. The immediate context of our work is San Diego County, California.

BACKGROUND

San Diego County is the fifth most populous county in the United States (US), with an estimated 3.2 million people (3). The most southwest county in the US, San Diego has a population highly diverse in race, language, ethnic heritage, age, education, income, and almost all other demographic characteristics. The County has 18 military installations and 18 federally recognized tribal nations, as well as the world's busiest international border crossing. Geographically, it is approximately the size of Connecticut. The topography ranges from coast line to mountains. Major educational institutions include the University of California San Diego, San Diego State University, community colleges, and a number of private colleges, many offering education and training for the health professions.

The health system is well developed. San Diego County has seven major integrated health care delivery systems, an array of community clinics, multiple senior housing complexes, numerous community service agencies, and a strong public health department that is a key component of the County of San Diego Health and Human Services Agency (HHSA). Although the healthcare delivery landscape is highly competitive, all hospitals have participated in a joint Community Health Needs Assessment conducted by the Public Health Institute of San Diego State University under the auspices of the Hospital Association of San Diego and Imperial Counties (4).

Four years ago, HHSA launched *Live Well San Diego* (LWSD) (5), a 10-year comprehensive initiative to create a healthy, safe, and thriving County for all 3.2 million residents. Through innovative collaboration among health care, human services, private sector, and community organizations, *LWSD* supports positive healthy choices, pursues policy changes for a healthy environment, and improves the human service culture.

Below, we highlight the evolution of leadership as we and our colleagues have navigated through a complex, changing environment and then use selected programs in LWSD to illustrate the collaboration that is advancing the health of the entire community.

ESSENTIAL ATTRIBUTES OF LEADERSHIP

Although many theories of leadership have been proposed, we posit that the fundamental attributes of leaders have been constant over time and across continents. Leaders are people with *Vision* – they see a future different than the *status quo*. They have *Influence* to drive change – they are able to communicate their vision and win others over to embrace and implement it. In addition, leaders are grounded in *Values*,

which provide a foundation for Vision and a passion to achieve personal and organizational mission. These essentials have characterized leaders for generations, but how they play out in public health continues to evolve.

VISION

What has changed in public health over the past 15 years? The Patient Protection and Affordable Care Act (ACA) has appropriately been credited with producing major changes in the health system. While its most visible impact has been on coverage and financing, the ACA for the first time created a National Health Strategy and a Prevention and Public Health Fund to help implement it. Several other factors have also contributed to creating an environment that recognizes the essential role of public health, most prominent among them:

- Wide-spread acceptance of the ecological model of health.
- Clinical advances in understanding and managing health.
- Recognition of the impact of behavior on health.
- Technological advances in biomedical and management technologies.
- The Information technology revolution, including electronic health records and "Big Data" analytics.
- Emphasis on a "systems perspective."

The Vision for a new health system has best been articulated by Berwick and colleagues at the Institute for Healthcare Improvement in the concept of "The Triple Aim:" (6) "Better health for the population. Better care for the individual. At lower per capita cost." This Vision is concise, expressed in a graphic, and easy to communicate to others. The ACA incorporated all of the Triple Aim concepts. The nation-wide embrace of the Triple Aim has made it possible for leaders in public health to champion an explicit Vision to transform a fragmented system through open communication, consensus building, stakeholder involvement, and processes for collaborative planning at the local level.

INFLUENCE

Influence is essential to achieve wide-spread change. Ideally, it is grounded in knowledge, which can be gained through formal education and expertise, gained through involvement with a broad range of people and institutions, and based upon accomplishments that have brought recognition and respect.

The trends noted above have increased awareness of the value of a systems perspective. The "systems perspective," broadly defined, has enabled public health to break out of the siloed role in which it had been typically viewed in the US to become interdisciplinary, inter-agency, and inter-organizational. For example, following 9/11, "preparedness" efforts integrated public health with military, fire, transportation, health care institutions, and social service organizations, among other entities. Well before Ebola, the global spread of diseases, such as SARS and HIV/AIDS, created awareness of international networks of public health organizations and the relationship of public health to other public and private sector organizations from transportation agencies to private employers. The "One Health" movement, the "Green" movement, and other recent trends reinforce the notion that public health is an integral player in many private as well as public initiatives and policies.

In short, the sphere of "influence" for public health has broadened immeasurably, creating both the opportunity and the necessity for public health leaders to expand their relationships far beyond their traditional sphere of local and state health departments.

VALUES AND COMPETENCIES

The traditional values of public health include service and interdisciplinary cooperation. The concept of "servant leader" characterizes many leaders of health organizations, including public health. Putting collective wellbeing ahead of personal gain is a priority that today can be measured as well as espoused. The values underpinning the "new" Vision of public health must include a willingness to change, to collaborate, and to be a central player in the health system of the future.

The "Competencies" fundamental to public health leadership include updated Knowledge, Skills, and Attitudes (KSAs). The knowledge base required is much broader than in previous centuries. Leaders must have in-depth understanding of the developments listed above – much broader and more extensive than in the past. In addition, public health leaders must have working familiarity with public policy, strategic planning, information management, social media, managed care, cultural competence, and human resource management, among other topics. Skills include communication with multiple audiences employing new technologies, inter-organizational collaboration, networking abilities, advocacy, and change management. Attitudes include the new values noted above.

EDUCATORS AND LEARNERS

One of the challenges of teaching the new generation of public health leaders is that many of those in senior teaching positions in the health professions fields have not themselves acquired the new vision and values. In order to educate a new generation of leaders in public health, the education system needs to change as well as the health system. The recognition of practitioners as experts, an academic appointment system that advances those who practice in the field as well as those who publish, rewards structured to encourage interdisciplinary endeavors, field experiences for students . . . all will contribute to changing education to produce a new generation of leaders.

The recent explosion of schools and programs specifically focused on the discipline of public health is noteworthy. The more the US has an "educated citizenry," as recommended by the Institute of Medicine in 2003 (7), the more the nation will achieve a "readiness for change" to improve individual behaviors and social norms that promote health. In addition, the more that public health is recognized as a discipline, the more influence and power public health professionals can be expected to have (8). However, caution is in order. For public health and the healthcare delivery systems to act in concert, education should be structured to reinforce a collaborative approach. Clinicians need to appreciate public health, and public health professionals must work in tandem with clinicians. This collaborative approach among professionals then argues for close working relationships among public health faculty and faculty of clinical disciplines, as well as management and technical disciplines.

Public health leaders must have breadth of perspective and influence that exceeds the bounds of any given discipline. Team work and professional recognition can be taught in didactic settings, but they must also be learned and reinforced through field placements, practicums, cross-venue site visits, and a variety of other techniques.

LIVE WELL SAN DIEGO

Live Well San Diego exemplifies the ability of a shared vision of "wellness" and a commitment to collaboration to enlist healthcare and other community leaders to collectively improve individual and population health. Among the many efforts being pursued under the *LWSD* umbrella, the following illustrate the approach and the collective impacts that it achieves:

- The San Diego Care Transitions Partnership has brought together 4 health systems (13 hospitals, collectively serving 92% of the Medicare fee for-service population) and HHSA's Aging and Independence Services to provide the combination of health care and social support services needed to reduce 30-day all-cause hospital readmissions. More than 23,000 patients have been served since the program started in 2013, significantly improving clinical outcomes and achieving demonstrated cost savings for Medicare.
- The Love-Your-Heart Campaign each Valentine's Day enlists an array of community partners throughout the County, including health care providers, employers, and local fire departments, to measure blood pressure and help to make San Diego a "heart attack and stroke-free zone". In 2014, almost 18,000 people were screened.
- The Chula Vista Elementary School District under the leadership of the District Superintendent, in partnership with County Public Health Services, and with participation from the entire District staff has introduced healthy eating to students and parents, revamped the physical education curriculum, and reduced students' body mass index (BMI) by 3.2% over 2 years. This program is now being replicated throughout the County's 42 school districts.

CONCLUSION

The era of the ACA is bringing vision, influence, and leaders' passion to transform an inadequate medical care delivery system into a more effective health system for the future. Public health is emerging as a trans-disciplinary field that integrates public health concepts and functions with healthcare delivery and clinical care of the individual. The health systems leaders of the future must have a vision that maximizes the contributions of public and individual health, as well as clinical and management approaches. Values that drive the passion to create and continuously improve the health of the nation must include the courage to push for change, an evidence-based approach to decision-making, and the skills to move political, organizational, and individual behavior. To train the future leaders of the health system, the education system must change as well. San Diego County demonstrates that these challenges can indeed be met.

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OPINION
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Working harder at working together: building collaboration between public health and health care delivery

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Keywords: collaboration, lessons learned, leadership, communication

In recent years, health care providers across the spectrum have begun to knit back together a system that has become excessively and dangerously fragmented. My own organization, Scripps Health[1], has been working to connect health care data with other public and private providers through regional health information systems[2]. In addition, we are working collaboratively with the San Diego County Health and Human Services Agency on a federally funded project to help patients move more easily between public and private health care providers (1).

Notwithstanding efforts, such as these, it is often difficult for public health practitioners and health care providers to collaborate. Such collaborative efforts should reduce inefficiencies in the greater healthcare system, result in improved responses to public health crises, and improve the support of public health. By developing improved organizational structures in both public health and health care organizations, as well as by improving communication between the two, collaboration can and will improve, but in doing so, it will require strong leadership at all levels on both sides of the public health/health care delivery divide. As we consider the Scripps Health experience in collaborating with public health organizations, we should remember that the definition of public health is broad, encompassing the prevention of epidemics and disease, protection against environmental hazards, prevention of injuries, promotion of healthy behaviors and mental health, disaster and recovery assistance for communities, and provision of accessible and quality health services (2).

Scripps Health has had a range of experiences engaging with public health practitioners, most notable in response to disasters. During Hurricane Katrina, Scripps answered the call from the Surgeon General of the United States and sent a medical response team to care for the evacuees, treating 500 patients a day at one point in Houston. Other teams of physicians and nurses assisted area clinics in treating survivors. In Houston, I supported and protected our teams, putting to use my training as a former police officer, and describing our efforts to proud employees at home (3).

We responded again in 2010, when a massive earthquake devastated the country of Haiti. We called for Scripps volunteers and almost 2,000 employees answered, resulting in two response teams being sent to provide medical care to desperate survivors. Before our teams left Southern California, I assessed the conditions in Haiti to determine opportunities for us to be of assistance, and to assure the safety of our volunteers. What I saw stunned me: people suffering from horrific injuries, and medical personnel lacking such basics as oxygen, anesthetic drugs, antibiotics, and blood. I had the opportunity to recall my EMT training when asked to assist with a surgical procedure; leaders need to show front-line staff that they are both capable of and willing to undertake the activities that they are asking of others. Our teams stayed in Haiti for a week, working with clinicians from the University of Maryland to ease the suffering of the earthquake survivors and to help them begin the long healing process.

[1]www.scripps.org
[2]http://sdhealthconnect.org/About_SDRHIE/participants.html

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For us, Katrina and Haiti were not merely incidental opportunities to help improve public health; they were organizational turning points. As employees at home learned how their colleagues responded to these emergencies, their pride in Scripps Health swelled, and the usual "silo" mentality fell by the wayside. More than ever before, we knew that we were all in this together and that we really were One Scripps. I will never forget how our supply chain managers responded to our Katrina response team, "We're here for you," and how one of our computer programmers called her co-workers on the team "heroes," writing, "Be safe and take care. T-E-A-M Together Everyone Accomplishes More" (4).

Opportunities to serve others in times of crisis can serve as key moments to bridge professional differences and bring people together, but the impetus for this must come from leaders, who set the tone. Leaders need to engage, get their hands dirty, and work with others outside their disciplines. They need to articulate a sense of higher purpose that can elevate individuals beyond their narrow interests and familiar circle of colleagues. They also need to serve as documenters of the collaboration, thus allowing their organizations to know the good that occurs when people venture beyond their comfort zones to work together.

If leaders work only for further collaboration during moments of crisis, they are not doing enough. The gospel of collaboration must not only be preached every day on a number of levels but also must be demonstrated and supported through the structures that leaders put in place within their organizations. Individually, leaders can nurture a collaborative mindset simply by venturing not only outside of their offices to engage with employees across their own organizations but also across organizational boundaries (5). Staying in touch with employees is important for many reasons, since it conveys the message that leaders need to move beyond the confines of their four walls or their cubicles to see what their colleagues are doing, and to understand the challenges they face on the job.

At Scripps, as leaders, we have created structures within our organization that break down disciplinary boundaries, developing and deploying multi-disciplinary teams to redesign areas of our operations. In redesigning our emergency rooms, a group of practitioners, including physicians, nurses, technicians, and administrators, worked together for weeks, sharing their points of view, addressing challenges, and arriving at solutions. As part of our structural changes, we have also created a "matrix" organization that brings local and system-wide executives together to make decisions. When people in different disciplines work together, applying a variety of points of view to pressing problems, our entire organization wins.

Communication is a central issue that leaders should address when seeking to enhance collaboration, which will result in bridging existing gaps. When I took over as CEO at Scripps, our organization was beset by conflict between administrators and physicians. Drawing on my earlier training as a police officer, I realized that both sides needed to understand better the other's point of view, so that the two sides could come together as partners. A formal structure was required in order to make this happen, and the Physician Leadership Council (PLC) was created, charged with advising administrators – up to and including the CEO – on key decisions faced by the organization. Although physicians were skeptical at first, it was not long before collaboration between the PLC and the administration was helping the organization come to compromise solutions that could be accepted by all. The PLC remains an important voice in the running of Scripps, and the organization has yet to reject a PLC recommendation, and the mutual trust that has emerged has enhanced collaboration.

Public health practitioners and health care providers may come from different backgrounds, but I believe that we have far more which unites us than divides us. What is now required is leadership drawn from both. Every opportunity should be seized to build organizational structures that will result in improved collaboration. Leaders of both public health and health care organizations are required to provide positive examples for creating structures that will lead to change.

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Application of situational leadership to the national voluntary public health accreditation process

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Successful navigation through the accreditation process developed by the Public Health Accreditation Board (PHAB) requires strong and effective leadership. Situational leadership, a contingency theory of leadership, frequently taught in the public health classroom, has utility for leading a public health agency through this process. As a public health agency pursues accreditation, staff members progress from being uncertain and unfamiliar with the process to being knowledgeable and confident in their ability to fulfill the accreditation requirements. Situational leadership provides a framework that allows leaders to match their leadership styles to the needs of agency personnel. In this paper, the application of situational leadership to accreditation is demonstrated by tracking the process at a progressive Kentucky county public health agency that served as a PHAB beta test site.

Keywords: situational leadership, public health accreditation, accreditation, leadership, student training

INTRODUCTION

The mission of public health, as identified by the 1988 Institute of Medicine (IOM) report, *The Future of Public Health*, is "assuring conditions in which people can be healthy" (1). A strong infrastructure is central to the mission of public health, since it supports the delivery of key public health services. The critical role infrastructure plays in assuring public health is underscored in a 2003 IOM follow up report that identified strengthening governmental public health institutions as an essential area of action for the twenty-first century. The 2003 report highlighted the key role that leadership plays in maintaining a strong public health system through the development of a competent public health workforce. It also identified the importance of leadership in such specific recommendations as making "leadership training, support, and development" a high priority for all governmental public health agencies, schools of public health, and the other entities within the public health system (2).

Successful leadership is contingent upon developing a clear mission and executing a vision to guide progress (3). Various frameworks have been developed to guide public health leaders in developing a mission and vision, including the three Core Functions of Public Health and the 10 Essential Public Health Services (EPHS) (4). While these frameworks are useful, they are macro-contextual, and may be disconnected from the day to day operations of a public health agency. The accreditation standards and measures developed by The Public Health Accreditation Board (PHAB) provide specific benchmarks to be utilized by agencies as a framework to guide their activities. While PHAB's standards and measures can be used to guide organizational leadership, the changes associated with accreditation require strong leadership and an immediate short-term strategic plan and long-term vision based on effectiveness, efficiency, and sustainability.

Academic public health programs, as part of their curricula, educate students in leadership theories and models, and often include skill training at both the masters and doctoral levels. Students of public health rarely are provided the opportunity to practice the leadership skills developed in the classroom or to test leadership theories in real world situations prior to degree completion. This article discusses one opportunity to transfer leadership theory and practice from the classroom to the practice setting. In this instance, practice based field experience provided a public health doctoral student the opportunity to utilize concepts learned in the classroom in a practice setting, and develop a case study, based on initial and follow up interviews with public health agency personnel, focused on leadership in the context of preparing for participation in a Beta Test of the PHAB pilot standards and measures.

SITUATIONAL LEADERSHIP

Situational leadership theory suggests that leaders should adapt their leadership styles based on the readiness, current skills, and developmental level of team members (5). It provides the leader with the flexibility to assess the situation and adopt a leadership style that best fits the needs of the follower. It is particularly well suited to leading public health agencies through the accreditation process as will be demonstrated.

Utilizing Situational Leadership requires leaders to be aware of the perceptions of their followers. What leaders say they do is one thing; what followers say they want and how well their leaders meet their expectations is another (6). Given the novelty of accreditation, and the potential anxiety engendered during the different phases of the process, public health leaders need to be aware of and adapt their leadership styles to match the readiness, current skills, and developmental status of the team members engaged in accreditation, allowing the agency to successfully navigate this intricate process.

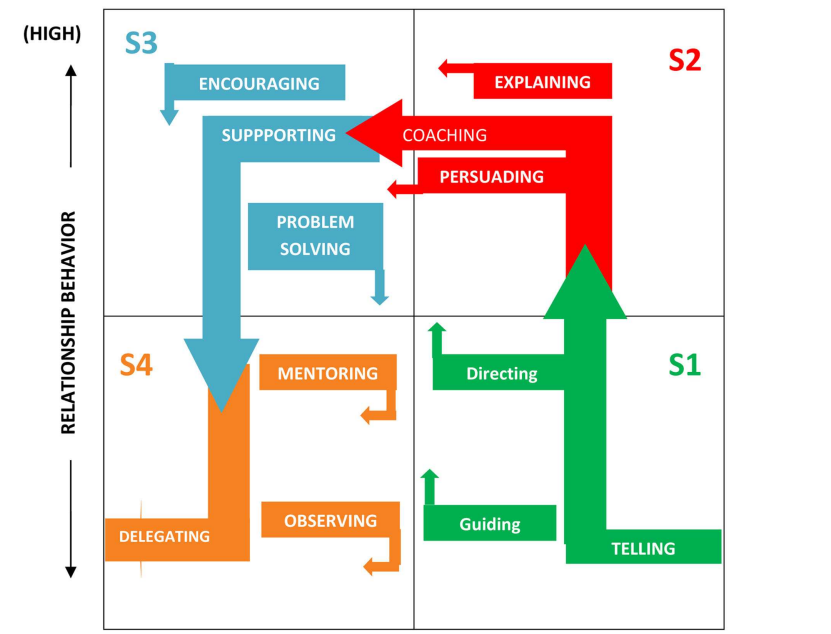
Situational leadership is based on two behavioral categories: task behavior and relational behavior. Task behavior is "the extent to which the leader engages in spelling out the duties and

responsibilities of an individual or group" (7). Relational behavior is "the extent to which the leader engages in two-way or multi-way communication if there is more than one person" (7). Thus, situational leadership provides a balance between (1) guidance and direction (task behavior), (2) socio-emotional support (relational behavior), and (3) the readiness level followers exhibit for a specific task (5). The leadership styles of situational leadership include:

1. Style 1 (S1) "Directing" characterized by "high task and low relationship" behaviors;
2. Style 2 (S2) "Coaching" characterized by "high task and high relationship" behaviors;
3. Style 3 (S3) "Participating" characterized by "high relationship and low task" behaviors;
4. Style 4 (S4) "Delegating" characterized by "low relationship and low task" behavior (5) (see **Figure 1**).

In situational leadership, readiness is defined as "the extent to which a follower demonstrates the ability and willingness to accomplish a specific task" (5). The major components of readiness are ability defined as "the knowledge, experience, and skill that an individual or a group brings to a particular task or activity," and willingness is defined as "the extent to which an individual or a group has the confidence, commitment, and motivation to accomplish a specific task" (5). As seen in **Figure 1**, follower readiness is a continuum from low to high as followers develop ability and willingness. Leaders match their leadership style to the readiness level of their followers as follows:

1. Level 1 (R1) occurs when the follower is "unable and unwilling" to perform the task and lacks confidence, motivation, and commitment;
2. Level 2 (R2) occurs when the follower is "unable but willing" to perform the task and requires some guidance;
3. Level 3 (R3) occurs when the follower is "able but unwilling" to complete the task, possibly because of insecurity; and
4. Level 4 (R4) occurs when the follower is "willing and able" to accomplish the task with confidence (5) (see **Figure 1**).



ABLE WILLING CONFIDENT	ABLE BUT UNWILLING OR INSECURE	UNABLE BUT WILLING OR CONFIDENT	UNABLE UNWILLING OR INSECURE
R4	R3	R2	R1
FOLLOWER DIRECTED		LEADER DIRECTED	
PUBLIC HEALTH ACCREDITATION STEP			
5. Accreditation Decision 6.Reports 7. Reaccreditation	4. Site Visit	3. Document Submission	1. Pre-Application 2. Application

FIGURE 1 | Situational leadership and public health accreditation. Adapted from Ref. (5).

SITUATIONAL LEADERSHIP AND PUBLIC HEALTH ACCREDITATION: A LOCAL HEALTH AGENCY CASE STUDY

While accreditation is not a new concept in the American health sector [initiatives such as The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) have been a part of the health care system for decades], it is a new phenomenon in public health practice in the United States. Informal discussions concerning the accreditation of public health agencies have occurred for some time; however, accreditation received a significant boost from *The Future of the Public's Health in the Twenty-First Century*, which stated that "despite the controversies concerning accreditation, greater accountability is needed on the part of state and local health agencies with regard to the performance of the core public health functions of assessment, assurance, and policy development and the EPHS" (8). This report led to the creation of the Exploring Accreditation project in 2004, the creation of PHAB in 2007, and ultimately the release of PHAB's standards and measures for voluntary national accreditation in 2011.

Accreditation is a useful tool for improving the quality of services provided to the public by setting standards and evaluating performance against those standards, and has been shown to be associated with higher performing health systems. In a working paper for the Robert Wood Johnson Foundation (RWJF), Mays demonstrated that clinical quality measures for care of myocardial infarctions were lower and mortality rates higher in hospitals not participating in JCAHO accreditation when compared to JCAHO accredited healthcare facilities (9). It may be postulated that accreditation of public health agencies will have a similar effect. PHAB states that its program is intended to develop and maintain "a high-performing governmental public health system that will make us the healthiest nation." Thus, PHAB "is dedicated to promote, improve, and protect the health of the public by advancing the quality and performance of state, local, tribal, and territorial public health departments in the United States" (10).

The PHAB accreditation process has seven steps; Pre-application, Application, Documentation Selection and Submission, Site Visit, Accreditation Decision, Reports, and Reaccreditation; and was developed after extensive review and revision, including a beta test of the process, which included 30 state, tribal, and local public health agencies (10, 11). Following an interview with the director of a local public health agency regarding the agency's experience as a beta test site, the authors noted that the agency's accreditation experience closely matched the four situational leadership styles in relationship to the stages of follower readiness displayed in **Figure 1**. As a result, a follow up interview was completed to confirm these findings, and to further discuss the application of situational leadership to the accreditation process.

The agency was well prepared for accreditation given its previous commitment to continuous quality improvement, as evidenced by its application to be a beta test site. In addition, the agency director was a member of the Kentucky Department of Public Health Quality Improvement Team prior to accepting her current position (12). This agency is also committed to performance measurement and management, having completed in 2008 a local public health system performance assessment that demonstrated a relatively high (69%) score in the overall performance of the EPHS (12).

During the initial interview with the agency director, it was apparent that leadership was viewed as a key element to accreditation success. Fostering complete organizational commitment to the process was of particular importance, including high commitment from contract and part time employes, as well as members of the local board of health.

Early in the accreditation process, particularly during the pre-application and application stages, and partially during document submission, the agency staff was relatively unfamiliar with the accreditation process (R1 follower readiness level as depicted in **Figure 1**), necessitating that the agency director engage in leader directed activities, primarily those shown in the S1 area in **Figure 1**. Such actions involved informing the agency staff of the requirements and processes of accreditation and directing them through the process with high task behaviors answering the question: what is public health accreditation? She utilized a directing style of leadership dealing with questions such as who, what, when, where, and how.

As agency staff members developed an understanding of the value of accreditation and gained some confidence through identifying their roles in the process and the documents necessary for review, they transitioned to an R2 stage of follower readiness as depicted in **Figure 1**, resulting in the director continuing highly directive behavior while adding high relationship behavior as well. A coaching, persuading, and/or explaining leadership style (S2 quadrant of the diagram) became important. While the leadership style was still high task, moving from direction to explanation occurred in order to answer the question, "Why is accreditation important to our agency?".

By the time the agency was ready for document submission its personnel had sufficient confidence to transition fully to the R2 stage of readiness. There were still gaps in knowledge and ability related to the accreditation process, thus necessitating a continuation of the S2 leadership style, including coaching, explaining, and continuously persuading public health agency staff members of the value of accreditation and the importance of each individual's role in the agency's effort.

By the time the agency reached the PHAB's beta test site visit phase, it had reached an R3 stage of readiness as depicted in **Figure 1**. As a result, leadership style was based on high relationship, low task behaviors characterized by quadrant S3. These follower-directed behaviors revolved primarily around encouraging and championing the efforts of a highly participatory agency staff, with agency leaders assuming the role of problem solvers instead of being more highly task oriented.

By the conclusion of the PHAB beta test experience, when mock accreditation feedback was provided, the agency staff members had developed to an R4 stage of readiness. The agency staff was able, willing, and confident with respect to accreditation. As a result, the leader's style had shifted to a low task and low relational behavior approach as described by quadrant S4. The director successfully delegated the accreditation coordination task to an accreditation coordinator, thus serving as an engaged mentor.

The PHAB beta test experience allowed the agency to further develop its quality improvement, performance measurement, and management infrastructure. The agency had successfully completed the three prerequisites of PHAB accreditation by developing a community health assessment, a community health improvement plan, and a refined strategic plan with clear mission and vision statements that were ready to be adopted. In addition, a 12 member accreditation team had been formed, being led by the full time accreditation coordinator.

As a result of the commitment and intense preparation exhibited by the staff, on February 28, 2013, the agency was awarded 5-year accreditation status by PHAB.[1] Accreditation of the agency was a direct result of the leadership exhibited by the agency's senior leadership. The accreditation result was based on the development of a high-performing team founded on full collaboration between staff members and leaders. The use of a situational leadership approach contributed to team development. Conflict resolution was more readily accomplished by the leaders' understanding of the needs of the staff members and the leaders' ability to utilize an appropriate leadership style to meet the staff members' needs. Due to the nature of the PHAB accrediting process, no ethical issues were raised by staff members during the beta test experience.

[1]http://www.phaboard.org/news-room/accredited-health-departments

SUMMARY

Situational leadership theory and skills learned in the classroom were effective in understanding the leadership required to effectively guide a public health agency through the process of preparing for PHAB accreditation. This theory of leadership is an appropriate approach for leading the accreditation process due to its flexibility as a follower driven model of leadership. Given the novelty and the complexity of the accreditation process, a highly functioning team is required and situational leadership provides a framework for public health agency leaders to successfully guide their teams through the process. Use of situational leadership will ensure that public health agencies successfully develop an ongoing quality improvement and performance standards plan throughout the accreditation process. Thus, a classroom leadership theory was found to be useful as an approach to being faithful to public health's mission to "assure conditions in which people can be healthy" (1).

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Collective impact through public health and academic partnerships: a Kentucky public health accreditation readiness example

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In the ever-changing, resource-limited public health environment, the use of partners found in the faculty and students of Colleges of Public Health can provide training, consultation, and technical assistance needed to increase local health department (LHD) workforce capacity to meet new public health demands including national public heath accreditation. This manuscript describes the provision of the backbone support activities of facilitation, data management, and project management by University of Kentucky's College of Public Health to Kentucky's LHDs seeking national public health accreditation.

Keywords: public health, workforce, academia, partnerships, collective impact

INTRODUCTION

Among the many recommendations for improvement of the public health system deemed "in disarray" in the 1988 Institute of Medicine (IOM) report, was a call for more formal interaction between public health academic settings and public health practice (1). Studies of the linkages between public health practice and schools of public health identify a variety of activities in existence between the two entities including public health practice steering/advisory committees in schools of public health, joint research opportunities, and the provision of technical assistance both from practice to schools and from schools to practice (2, 3). These activities and other partnership opportunities between academia and practice exist in formal agreements and in informal relationships (3).

Formal examples of partnerships include the Centers for Disease Control and Prevention (CDC)-funded Public Health Prevention Research Centers (PRC), which work as interdependent associations of accredited schools of public health, public health practice partners, and community members to conduct prevention research (4). In addition, HRSA-funded Public Health Training Centers (PHTC), first established in accredited schools of public health, assess the training needs of the public health workforce and deliver training to meet current and emerging public health needs of practicing public health workers (5, 6). Informal partnerships also exist and often arise from the interaction of individual faculty members in schools of public health and public health professionals who identify key activities where partnering together can meet the needs of both organizations (3).

The University of Kentucky's College of Public health (UKCPH), site of both a PRC and PHTC, has a long history of partnership with the Kentucky governmental public health leadership and workforce. The governmental public health workforce in Kentucky includes workers located in both the Commonwealth of Kentucky Department of Public Health and in 61 local public health jurisdictions (15 multi-county districts and 46 single county health departments). Each of the 61 local public health jurisdictions vary greatly in size from city–county health departments with over 300 employees to small single county health departments with less than 10 employees (7).

Preparing the public health workforce to meet the ever-increasing demand for public health services in Kentucky is more important now, in the wake of an economic recession, than ever before. Kentucky, like many other states, experienced significant public health job loss and associated programmatic impacts during the 2008–2009 economic recession (8). This reduction in the workforce comes at a time when the need for preventive services, environmental services, and other public health initiatives continues to rise (8–10). The remaining members of the public health workforce attempt to provide services in an environment where efficiency, defined as "the use of minimal resources – raw materials, money, and people – to produce a desired volume of output" (11) is critical.

In this ever-changing, resource-limited public health environment, the use of partners to maximize the capacity of the governmental public health workforce becomes more important than ever (12). Colleges of Public Health such as UKCPH can provide links to other public health system partners and through training, consultation, and technical assistance increase on-the-ground local health department (LHD) capacity to meet new public health demands that include national public health accreditation. In this pilot study, UKCPH faculty and students developed a pilot tested elements of the Collective Impact model's backbone support

organization for public health accreditation readiness activities in partnership with Kentucky LHDs. This manuscript describes the local public health accreditation environment, the needs in Kentucky for accreditation readiness assistance, and the opportunity for collaboration between the UKCPH faculty and students and those health departments pursuing accreditation.

BACKGROUND/LITERATURE REVIEW

NATIONAL PUBLIC HEALTH ACCREDITATION

In September 2011, the Public Health Accreditation Board (PHAB) launched the first voluntary accreditation system for state, local, and tribal public health agencies in the United States (13). This event is the result of years of effort that can be traced to a variety of watershed events in public health beginning with the 1988 IOM report, *The Future of Public Health*. In this report, the IOM characterized the United States public health as a "system in disarray" (1) indicating a great need for change and improvement. In 2002, IOM released another major report, The Future of Public Health in the Twenty-First Century, that made recommendations on a variety of public health issues including consideration of a public health accreditation system and increased training for public health leaders (14). In 2007, following recommendation by the exploring Accreditation Steering Committee, PHAB was incorporated (13).

The mission of PHAB is to promote and protect the health of communities by advancing the quality and performance of all public health departments in the United States (13, 15, 16). In 2009, PHAB conducted a national beta test in which 30 state, local, and tribal health departments, of varying sizes, completed the accreditation process and provided feedback on both the process and the accreditation standards. The goal of PHAB is to have 60% of the United States population served by an accredited health department by 2015 (13). Accreditation not only includes an emphasis on quality improvement, but creates focus, via the standards and measures for the 10 essential public health services (EPHS) (17). Specifically, PHAB places significant emphasis on community health assessments (CHAs) (EPHS #1), community health improvement plans (CHIPs) (EPHS #5), and agency strategic plans (EPHS #5) to require completion of these elements as prerequisites to applying for accreditation.

The CHA is defined by PHAB as

> . . . a systematic examination of the health status indicators for a given population that is used to identify key problems and assets in a community. The ultimate goal of a CHA is to develop strategies to address the community's health needs and identified issues. A variety of tools and processes may be used to conduct a CHA; the essential ingredients are community engagement and collaborative participation (18).

The need for LHDs to conduct a community needs assessment goes beyond the prerequisite requirement by PHAB. The CHA also provides the basis for the CHIP defined by PHAB as

> A CHIP is a long-term, systematic effort to address public health problems on the basis of the results of CHA activities and the community health improvement process. This plan is used by health and other governmental education and human service agencies, in collaboration with community partners, to set priorities and coordinate and target resources (18).

In both the CHA and the CHIP, the LHD must evaluate the community and thus the partners and linkages within the public health system of that community (17). The remaining PHAB prerequisite, the agency strategic plan, sets the specific direction for the LHD (18). This direction may also be based on the results of the CHA and CHIP. For many LHDs, these processes are familiar, however, others, often due to the reduction in resources, have not completed a CHA or CHIP for many years or may not feel they have the expertise or staff to coordinate these processes.

COMMUNITY ENGAGEMENT

Of critical importance to the CHA and CHIP processes for LHDs is "community engagement and collaborative participation" (18). Scutchfield et al. substantiates this premise by stating that "community involvement is an absolute core value of effective public health practice" and "improving the public's health demands citizens that feel connected to the decisions being made" (19). Kopell names this process "civic engagement," which he defines as strengthening the relationship between the decision-makers and those affected by the decisions (12).

Local health departments that attempt to assess needs and develop and implement solutions to public health problems alone find that these solutions may be beyond the scope of a single governmental public health agency (20). However, inviting community members to the table to solve public health problems does not guarantee an effective outcome. Kopell terms a "faux civic engagement," as an attempt to bring partners together in a process that is rushed and without the right people being involved. In "faux civic engagement" critical questions are not asked and participants feel that they have not been listened to, become frustrated, and wonder why they have wasted their time (12).

MODELS FOR COMMUNITY ENGAGEMENT

A number of models for community engagement have been researched and implemented to provide structure to the process and increase the benefits of involving members of the community and specifically members of the public health system. Mobilizing for Action through Planning and Partnerships (MAPP) is a model developed by the National Association of County and City Health Officials (NACCHO) and the CDC. LHDs and their communities may use MAPP to conduct CHAs and CHIPs (21). MAPP includes organizing of community stakeholders, collaborative visioning, and community assessment using four tools with questions and strategic initiative development and actions (21).

Many additional models exist for providing structure to a CHA including healthy cities, with a focus on broad definitions of health, root causes, and system change (19). In addition, the Kettering Foundation has focused on citizens naming community problems as well as taking responsibility for solutions (22). Asset-mapping models are used by community members to identify and build upon work already in place in the community (23). Models may also be adopted from community-based participatory research such as Expanding the Empowerment Education Model (EEM), which utilizes listening, to internalize community positions, dialog, to discuss various community positions, deliberation, to reason and decide on a direction, and action, to implement community decisions (24). The Healthy Neighborhoods Initiative

model utilizes quantitative information from statistics, qualitative information from interviews, and groups and asset-mapping strategies (25).

Understanding the necessity of collaboration to address large or small community issues is not a new concept. Regardless of the model selected to engage in assessing community needs or planning for improvement, a wide variety of progress levels emerge. Some groups are successful in obtaining community engagement and making a difference in the issue at hand while others flounder. Kania and Kramer propose not only a model for cross-sector coordination, Collective Impact, but within it provide an element unlike others previously mentioned – a supporting infrastructure. The authors propose "the expectation that collaboration can occur without a supporting infrastructure is one of the most frequent reasons why it fails" (26).

Kania and Kramer's Collective Impact model specifies five conditions of community engagement success – having a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication, and a backbone support organization (26, 27). The backbone support organization concept provides a supporting infrastructure for stakeholders engaged in CHA or community improvement planning through the provision of a dedicated staff separate from community partner organizations (26, 27). A specific Cincinnati-based education initiative, STRIVE, which utilizes the Collective Impact theory and employs the backbone support organization concept, synthesized backbone support duties down to facilitation, data management, and project management (26).

METHODS/STRATEGIES/INTERVENTION APPLICATIONS

INITIAL NEEDS ASSESSMENT

To provide focus to the UKCPH practice-based activities and in light of the Fall 2011 scheduled launch of public health accreditation, UKCPH faculty conducted a brief electronic survey of each LHD director in Kentucky regarding six elements of public health accreditation: identification of an accreditation coordinator (required by the PHAB process); completion within the last 3 years of the PHAB prerequisites – strategic plan, community needs assessment, and CHIP; completion of a quality improvement plan; and a process in place for updating and evaluating policies and procedures (see **Table 1**).

Responses were received from 56% of the LHD directors in the Commonwealth of Kentucky. The majority of respondents had identified an accreditation coordinator (91%) and had a process in place for updating and evaluating policies and procedures (53.1%). However, although 40.6% of respondents had completed a CHA within 3 years, only 2% had completed a CHIP from the results of the needs assessment. Low responses were also received regarding the completion of a strategic plan (12.5%) and a quality improvement plan (21.9%).

University of Kentucky's College of Public Health faculty, building from the Collective Impact model (26), the LHD director survey results, and the elements of a backbone support organization as identified by STRIVE (i.e., facilitation, data management, and project management) developed and pilot tested the elements of a backbone support organization as a role for academic public health to assist LHDs with accreditation readiness.

Table 1 | Accreditation readiness survey of Kentucky LHDs.

Survey question	Yes	No	In process
Accreditation coordinator identified	29 (91%)	3 (9%)	0
Strategic plan completed	4 (12.5%)	15 (46.9%)	13 (40.6%)
Community health assessment completed	13 (40.6%)	7 (21.9%)	12 (37.5%)
Community health improvement plan completed	2 (6.3%)	19 (59.4%)	11 (34.4%)
Quality improvement plan	7 (21.9%)	14 (43.8%)	11 (34.4%)
Process for updating and evaluating policies and procedures	17 (53.1%)	8 (25%)	7 (21.9%)

BACKBONE SUPPORT ORGANIZATION – DUTY 1 – FACILITATION

University of Kentucky's College of Public Health faculty developed the Kentucky Accreditation Coordinator Learning Community, which consisted of LHD directors and accreditation coordinators interested in learning about the elements of accreditation. The group met monthly during which UKCPH faculty provided meeting management, agenda development, and training. Topics were introduced either by UKCPH faculty or by members of the group and included development of a web-based inventory of accreditation resources, development of an accreditation readiness team, partnership collaboration, strategic planning, use of public health students in data collection, development of a quality improvement programs, community needs assessments, and a variety of other issues.

Through monthly contact with LHD directors and accreditation coordinators via the accreditation learning community, UKCPH faculty fielded questions on a wide variety of accreditation readiness activities. One of the most frequent issues involved the need by LHDs for outside facilitation of community forums organized as a part of the CHA process. Using trained UKCPH facilitators, in January 2012, UKCPH faculty and students began a pilot test of community forum facilitation in a multi-county public health district in Kentucky. Facilitation of these forums included consultation with the management of the district on community forum agendas, stakeholder involvement, and process for obtaining community feedback based on the four assessments of the MAPP process.

BACKBONE SUPPORT ORGANIZATION – DUTY 2 – DATA MANAGEMENT

As the pilot process evolved in the public health multi-county district, a need arose for data management to obtain a disease burden picture of each community for use in the Community Health Status assessment of the MAPP process. Members of the UKCPH faculty worked closely with the epidemiologist of the public health district to identify appropriate sources of information and develop a template for disease burden information which included county specific, state, and national information on social factors, maternal child health, behavior factors, diabetes indicators, access to care, cancers, and respiratory illness information. A sample of the format is provided in Table S1 in Supplementary Material.

Members of the UKCPH faculty also coordinated the use of public health masters and doctoral level students to take notes and provide meeting summaries following each community forum. Additional data management duties included development and analysis of electronic and paper community surveys for each county within the district, use of public health doctoral students and university medical librarians to identify evidence-based intervention information for community workgroups, and the collection of all information into an overall project report for community.

BACKBONE SUPPORT ORGANIZATION – DUTY 3 – PROJECT MANAGEMENT

With lessons learned from the pilot project, UKCPH faculty members formalized the methodology used to facilitate community forums and provided data management to LHDs utilizing a project management flowchart. The format for delivery of project management services was based on community engagement theory and the MAPP process augmented by asset mapping, quality improvement, evidence-base intervention review, and measureable goals and objectives development (see **Table 2**).

Continuing to serve as the backbone support organization to provide LHDs with resources and structure for community needs assessment and community health improvement planning (26, 27), UKCPH faculty members have provided all or part of this process and backbone support organization functions to additional counties in Kentucky. The goal for UKCPH's process is to provide support such that any LHD willing to pursue accreditation can be assisted and moved forward in the process using these services.

Table 2 | Elements of the UKCPH accreditation readiness backbone support organization.

Elements of a backbone support organization as identified by STRIVE (26)	UKCPH activities
Facilitation	Faculty helped develop the Kentucky Accreditation Learning Community
	Faculty taught sessions on accreditation readiness topics to the learning community participants
	Faculty facilitation of community forums for CHA/CHIP
Data management	Faculty and students collaborated with Kentucky regional epidemiologists to create a format and data sources from which a disease burden picture for LHD jurisdictions was created
	Faculty and students created community surveys and analysis of results for the CHA/CHIP process
Project management	Faculty and students provided technical assistance in the form of answering questions from LHDs, formalizing a process for CHA/CHIP facilitation and provided access to evidence-based interventions for LHDs to use in addressing identified health needs.

DISCUSSION

In consideration of the increasing demands upon public health and the impact of reductions in funding on staff and programing, it is understandable that LHD staff might find CHA and community health improvement planning daunting tasks. Even though community engagement theories and models offer structure to bringing partners and stakeholders into the process of solving community problems, much of the work falls on a staff already burdened by day-to-day tasks and potentially unfamiliar with available models.

Employing the Collective Impact model for community engagement speaks to the essence of public health collaboration as it includes steps to provide a common agenda, measurements, and communication. However, this model also provides a role for public health academic partners – the role of the backbone support organization providing facilitation, data management, and project management for LHDs seeking national public health accreditation. Faculty can provide expertise in facilitation, data management, and project management to the LHD while including students in the deployment of these resources which provides a much needed practice-oriented learning experience. LHDs, however, must be aware that the responsibility for relationship building with community stakeholders is a component of CHA and community health improvement planning that cannot be outsourced to faculty or students in a backbone support organization. LHDs must be aware that the success of any community engagement process hinges on these relationships.

Working with members of Kentucky's Accreditation Readiness Learning Community continues in topics such as facilitation, coalition building, team building, and quality improvement techniques. This learning community has enabled UKCPH to expand the reach of the backbone support organization and further the accreditation readiness and workforce capacity in Kentucky.

CONCLUSION

The UKCPH process of becoming a backbone support organization for the LHDs of Kentucky seeking national public health accreditation was born from a desire to meet each organization "where they are" with regard to accreditation and to assist them to move forward. That desire and the interaction between UKCPH faculty members and LHD directors and accreditation coordinators through the Kentucky Accreditation Learning Community, in an environment impacted by reductions in staff and resources, produced a dynamic process that grew to meet additional needs with each application. For PRC's, PHTC's, Colleges of Public Health, or other organizations desiring to become backbone support organizations for the LHDs in their service areas, the following recommendations have been developed:

- Understand the environment in which LHD works – beginning with a needs assessment to identify an area where faculty and student resources can be useful.

- Increase the skills of the faculty and students to include facilitation, data management, and project management in order that the need for these backbone support organization services at the local level can be provided or supplemented.
- Base processes in proven methodology while remaining flexible enough to meet the LHDs "where they are."

Providing a structure through the backbone support organization while removing some of the day-to-day burden of CHAs, and developing improvement planning through facilitation, data management, and project management will move the process of community engagement and community problem-solving forward. Consequently, Colleges of Public Health can assist public health practitioners and their partners to engage in the action steps of intervention and ultimately the improvement of the public's health while providing real-world learning settings for students.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at http://www.frontiersin.org/Journal/10.3389/fpubh.2015.00044/abstract

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The journey toward voluntary public health accreditation readiness in local health departments: leadership and followership theories in action

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Local health department directors' intent on getting their organizations ready for accreditation must embrace the blurring of leader/follower lines and create an accreditation readiness team fueled not by traditional leader or follower roles but by teamship.

Keywords: accreditation, leadership, followership, public health

INTRODUCTION

The Institute of Medicine's 2002 report "The Future of the Public's Health in the 21st Century" made several recommendations for improving and building capacity of local public health agencies, including increased training for public health leaders and the creation of an accreditation system (1). In 2007, following recommendations by the Exploring Accreditation Steering Committee, the Public Health Accreditation Board (PHAB) was incorporated (2).

The mission of PHAB is to promote and protect the health of communities by advancing the quality and performance of all public health departments in the United States (3, 4). In 2009, PHAB conducted a national beta test in which 30 state, local, and tribal health departments, of varying sizes, completed the accreditation process and provided feedback on both the process and the accreditation standards. The national public health accreditation program was launched in late 2011 after beta test adjustments were completed (2). Other organizations, such as hospitals and schools, have utilized accreditation systems for many years, and while information regarding impact is limited, evidence is encouraging regarding positive changes in service quality and outcomes (5). The national public health accreditation system is the first national accreditation effort to measure performance and ensure quality public health services in local communities. Since difficult economic times cause health departments to adjust services and staff, the field of public health strains under the increasing pressures of infectious and chronic diseases, emergency preparedness concerns, and the loss of essential services (6). The underlying premise of national public health accreditation, performance improvement, has become increasingly important.

As local health department leaders and staff become appropriately educated about the PHAB standards and measures for accreditation and the technical assistance tools provided by many of public health's national partners (3), the journey toward public health accreditation begins in the local health department. As this journey progresses toward application for accreditation and site survey (7), local health departments must evaluate their work against accreditation standards and identify both strengths and challenges. Through the creation of a highly functioning team, the concepts of leadership and followership theories are seen in action and knowledge gained from these concepts in the form of teamship will contribute toward successful accreditation readiness.

LEADERSHIP

In the book, *Leadership: Theory and Practice*, Northouse defines leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (8). Leaders of local health departments must draw upon this concept of "influence" as they introduce accreditation to board and staff members. Accreditation concepts include an emphasis on the 10 essential public health services, organization-wide quality improvement, and measurements of performance (9). Such concepts are new to many individuals associated with local health departments, and leaders will need to understand how to elicit interest by their staff members and growth in their understanding of the accreditation process (10) in a program that has only been recently launched (2, 3). While many factors within communities and local health departments influence performance of local health departments, leadership is of critical importance (11, 12). Knowledge of the impact of leadership

has evolved from the trait-based theories to more modern, contingency theories that add a focus on the follower (13). In this paper, a sample of evolving theoretical approaches to understanding leadership will be used to view the leader's potential impact on the local health department's readiness for national public health accreditation.

THE LEADER AS AN INDIVIDUAL

In the past, the study of leadership focused on the personality of leaders implying that only specific personality types could be effective leaders. The personality perspectives of leadership focused on those qualities that leaders possess which enable them to influence specific behaviors in others (8). Kouzes and Posner, in a cross-cultural study, identified honesty, a forward-looking perspective, competence, and an ability to inspire as leadership qualities, which stand the test of time (14). Quinn categorizes critical leadership traits as having the ability to focus on others, being results-oriented, and being open to external signals that suggest needed change (15). Recognition of the impact adherence to accreditation standards can have on a local health department may be examples of external signals of change.

Examples of the personality perspectives or trait theories of leadership can be found in those leaders who have already prepared staff members for accreditation. By honestly explaining what is known about the PHAB process and by presenting accreditation as a proactive means of improving the provision of public health services (3), these individuals are leading their organizations into the future. These leaders are seen addressing the concerns of the 2002 IOM report regarding the future of the public's health as they use their forward-looking perspectives to learn from the roadmap that accreditation provides in planning, assessment, and community collaboration for organizational improvement (16).

THE LEADER CONSIDERS THE FOLLOWER

In addition to the traits that leaders possess, there are a variety of theories that explain what specific leaders do to influence a group (8). These theories result in considering the person being led—the follower. In her book, *Followership: How Followers Are Creating Change and Changing Leaders*, Kellerman states that followers are "subordinates who have less power, authority and influence than do their superiors and who therefore usually, but not invariably, fall into line". She defines the concept of followership as "the response of those in subordinate positions (followers) to those in superior ones (leaders)" (17).

The theory of transformational leadership involves the process a leader goes through to bring about the transformation of their followers and their methods of work. Transformational leadership includes a leader's use of emotion, formation of long-term goals, and an assessment of the needs of followers (8, 18). True transformational leaders have an exceptional level of influence (8) as they strive to create a personal connection with individuals particularly during times of great change (19). It is through this personal connection that transformational leaders discover the strengths in those they work with and find ways to capitalize on them (10).

Examples of transformational leadership can be found as local health department leaders embrace changes in the field brought about by increasing community problems, decreasing financial support, and the advent of voluntary public health accreditation. Specific examples of transformational leadership can be seen in health department leaders forging new partnerships created through the accreditation readiness process. Leaders of small health departments with minimal resources have banded together with neighboring county and district health departments, universities, and other non-profit entities to work toward community health assessments (20) required as pre-requisites to accreditation (7). Such partnerships break down silos that have existed in the public health system, capitalizing on the strengths of each partner, and transforming the way the business of public health occurs (12, 21).

Other leadership theories include the situational leadership theory, in which leaders first understand the level of competence and commitment of their followers and then match their leadership styles to that level. Variations are seen in the level (high or low) of directive (task) behaviors in which the leader gives direction, establishes goals, sets timelines, and defines roles. Variations are also seen in the level (high or low) of supportive (relationship) behaviors in which the leader is concerned with follower's feelings and communication (22).

Examples of situational leadership may be seen throughout the journey of accreditation readiness. Early steps in the process will involve high levels of direction as leaders must give assignments to followers as to who will serve on specific accreditation teams and which projects, either accreditation, pre-requisites, or programmatic performance improvement initiatives will occur first. During this period, high levels of supportive behaviors will also be needed from leaders as followers will be working on projects, using unfamiliar terms, and working with other individuals for the first time. However, as the educational level (competence) and the understanding and acceptance (commitment) of followers toward the accreditation process increase, leaders will be able to change levels of directive and supportive behaviors (23).

THE FOLLOWER

Bennis writes that followers are more important now than ever before as problems are more complex and solutions can only come through collaborative problem solving and process implementation at all levels of the organization (24). Accreditation readiness is a complex process unfamiliar to many local health department employees. In order to successfully complete the accreditation readiness checklist and associated responsibilities, all members of the organization will need to be involved in standard interpretation, data collection, and performance improvement (7). They will need to increase their comfort level with performance improvement and continually strive to perform their jobs more efficiently and effectively.

THE FOLLOWER AS AN INDIVIDUAL

Similar to the early study of leaders, the study of followers is often dedicated to the traits of good followers. In *In Praise of Followers*, Kelley writes that followers can be both effective and ineffective. Effective followers are enthusiastic, intelligent, and self-reliant in their pursuit of organizational goals. They dedicate themselves to increasing their job competence in order to maximize the impact on the organization. Kelley describes an effective follower

as courageous, honest, and credible (25). The effective follower can also be referred to as the "star follower" who does not follow a leader blindly, but constructively questions processes and procedures in order to improve the organization (26). The star follower is ideal for an accreditation readiness effort as questioning processes and procedures is at the heart of performance improvement. Star followers in the accreditation readiness process can be seen gaining expertise, leading initiatives, and building teams.

In contrast to the trait theories or personality perspectives of leadership, which tend to be positive in nature, Kelley also identifies other types of followers who are negatively contrasted to the star follower. Alienated followers often began as star followers but allow a negative experience to cause them to become angry and withdrawn. Rather than assisting with improvement of the organization, the alienated follower often tears down what leaders or other followers are trying to build (26). In an accreditation readiness scenario of a local health department, an alienated follower can be very detrimental to the process. While intelligent enough to be a contributor, the negative attitude of an alienated follower will cause friction between the leader and other followers. As the leader portrays the benefits of accreditation as a means of demonstrating the value of public health to the community (3), the alienated follower will undermine this message by dwelling on perceived increased staff workload and costs to the organization or the unknown impact of accreditation on health outcomes. The alienated follower also represents a wasted source of job knowledge that could have been used in any aspect of the accreditation process.

Additional types of followers are Sheep (passive followers) and Yes-People (conformist followers). Both of these types of followers are passive. While the Yes-People or conformist followers are more involved in the workplace than the Sheep or passive followers, neither group are individuals who think for themselves. The Yes-People are dependent on their leaders for direction and often tell them only what they want to hear not the crucial information that they need to know (26). Both of these types of followers are detrimental to the accreditation readiness process as they withhold useful expertise in favor of waiting on the leader to direct them. In addition, the alienated, passive and conformist followers test, but not necessarily erode, the ability of the leader to transform the organization.

THE LEADER WITH THE FOLLOWER

The "command and control" form of leadership identified leaders as in control and followers as silent and subservient (13). This outdated approach has given way to blurred lines between leaders and followers in which leaders are asked to support their followers, and followers are frequently called upon to use judgment and critical thinking skills (27). In today's workplace, designated leaders often follow and designated followers lead. According to Kellerman, the reason roles between leaders and followers reverse at times, often in the same day or with the same project, centers on competence (17). When competence was listed as one of the traits of personality perspective leadership theory (14), consideration was not given to the fact that a follower might be more competent in a specific area than the designated leader. When this is the case, leaders must employ the elements of situational leadership and adjust their leadership approach based on the competence and commitment of the follower (8). Thus situational leadership theory supports a leader's delegation or blurring of traditional leader/follower roles, in the case of a competent and committed follower (23).

Townsend and Gebhardt refer to the blurring of lines between leader and follower roles as a continuum. At the extreme left of the continuum is "Capital L Leadership," which indicates the formal leadership duties of organizational direction setting and resource allocation. Moving right on the continuum leads to "small L leadership" in which people skills play key role in getting people to do specific tasks (27). Another step to the right, finds Active Followership, which corresponds to Kelley's "star follower" (26) concept and indicates an engaged follower (27). At the extreme left of the continuum is the passive follower who functions much like Kelley's sheep or passive follower (26) and is completely unengaged (27).

However, Townsend and Gebhardt do not stop with just another method of classifying leaders and followers. They discuss what happens in the middle of the continuum where leaders and followers meet and the term of "teamship" is introduced. With the concept of "teamship," they reinforce Kellerman's theory of the periodic reversal of leader and follower roles. Teamship indicates interaction between leaders and followers. The focus is on a shared goal with members of the team assuming leader and follower roles according to the expertise needed by the team at any given moment of a project's evolution (27). The transition between designated leader to team follower and back again is so seamless in true teamship that observers find it hard to identify the designated leader at all (27).

As local health departments engage in the accreditation readiness journey, health department leaders quickly realize that the tasks and responsibilities of accreditation are far reaching throughout the organization. Often trained as clinicians (28), health department leaders attempting to follow the road to accreditation need the expertise of varied disciplines that make up the health department staff. Many local health departments form accreditation readiness teams either dividing the responsibilities along the 10 essential public health services or PHAB domains or progressing through all aspects of accreditation in tandem together using expertise from all sources (29). Such accreditation readiness teams are excellent examples of teamship in which title or position in the organization is not the relevant factor. Instead the relevant factor is the expertise brought by the individual to the group.

CONCLUSION

To lead an organization to improve its quality is a complex endeavor. Leadership can be analyzed according to leadership theories, which address the traits of leaders, the leaders' ability to transform the people and systems with whom they work, or by the leader's adjustment to follower needs. Each of these attempts to identify high quality leadership evidenced in an organization is complicated by the organizations environment, financial condition, rate of change in the industry, and by the followers with whom the leader works. Followers can be analyzed according to effective or ineffective traits and the impact on the leader of differing levels of follower commitment. However, both leaders and followers can have the most powerful impact

on an organization, specifically a local health department beginning the journey toward accreditation readiness, when teamship is employed. Teamship occurs when leaders and followers interact, egos are set aside, and expertise and the job at hand dictate the changing roles of the members of the team. Leaders, such as local health department directors, who are intent on getting their organizations ready for accreditation must embrace the blurring of leader/follower lines and create an accreditation readiness team fueled not by traditional leader or follower roles but by teamship. This expanded expertise together with a genuine desire for organizational improvement provides the necessary tools for improvement and for success in the journey toward voluntary public health accreditation readiness.

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Economic evaluation enhances public health decision making

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Contemporary public health professionals must address the health needs of a diverse population with constrained budgets and shrinking funds. Economic evaluation contributes to evidence-based decision making by helping the public health community identify, measure, and compare activities with the necessary impact, scalability, and sustainability to optimize population health. Asking "how do investments in public health strategies influence or offset the need for downstream spending on medical care and/or social services?" is important when making decisions about resource allocation and scaling of interventions.

Keywords: economic evaluation, cost analysis, cost-effectiveness analysis, cost-benefit analysis, cost-utility analysis, public health economics, public health leadership

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In 2012, the United States (U.S.) total health care spending was $2.8 trillion (1). Most were used to treat diseases rather than prevent them, with only 2.7% dedicated to prevention (1). According to the National Association for County and City Health Officials and the Association of State and Territorial Health Officials, local and state health departments cut almost 60,000 public health jobs from 2008 to 2012 (2, 3). Contemporary public health professionals must address the health needs of a diverse population with constrained budgets and shrinking funds. It is critical for public health professionals to use a comprehensive approach to decision-making. This article's aim is to provide a framework for use of economic evaluation by public health decision makers at the local, state, tribal, and national levels. We describe types of economic evaluation and provide examples of economic evaluation used by two public health research networks, the Centers for Disease Control and Prevention's (CDC's) Prevention Research Centers (PRCs) Program and Robert Wood Johnson Foundation (RWJF) funded Public Health Practice-Based Research Network (PH-PBRN).

Evidence-Based Public Health and Decision Making

Public health professionals want to improve outcomes and minimize costs; evidence-based public health (EBPH) is integral in their decision-making process. EBPH is defined as "the development, implementation, and evaluation of effective programs and policies in public health through application of principles of scientific reasoning." (4) EBPH uses the best available evidence, taking into consideration the population demographic characteristics, projected or tested program and intervention impacts, and estimated costs (5, 6). Understanding the economic evidence of public health intervention is an integral part of EBPH. Economic evidence can provide insight into the value of public health investments to the overall health system. Evidence suggests that increased investment in prevention activities and improvements in public health practice and decision making produce measurable and sustainable health gains (7). A study of local public health agencies in California from 2001 to 2008 found that a $10 per capita increase in public health investment could save 9.1 lives per 100,000 (8). This translates to 27,000 deaths per year averted with an

economic value of $212 billion or more than $100 of benefit for $1 invested (8).

Public health professionals have become skilled at considering the epidemiologic evidence of health issues. Epidemiology is the cornerstone of public health, and informs policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare and interventions. But public health professionals also have to consider environmental constraints, such as funding and capacity, when choosing where to focus efforts. Economic evaluation provides evidence of the feasibility of intervention scalability and sustainability. Determination of the costs and benefits of public health interventions provides data for public health professionals and decision makers to use when choosing which interventions are effective, efficient, equitable, scalable, and sustainable (7, 9). Asking "how do investments in public health strategies influence or offset the need for downstream spending on medical care and/or social services?" (10) adds to informed decision making. Yet, economic evaluation remains a competency gap in public health decision making (11). To address this competency gap and prepare contemporary public health professionals, training for a public health profession might

- Offer elective courses on economic evaluation and public health economics in schools of public health
- Establish more post-doctoral trainings on economic evaluation and public health economics, such as the CDC Prevention Effectiveness Fellowship
- Include economic evaluation in Master and Doctor of Public Health (M.P.H. and Dr.P.H.) requirements and
- Provide continuing education for public health professionals at the local, state, tribal, and national levels through public health leadership institutes and training centers.

Economic Evaluation

What is economic evaluation? By definition, economics is the study of decisions, through the examination of program incentives and consequences, and the measure of service production, delivery, and consumption (12). Economic evaluation is defined as "the systematic appraisal of costs and benefits of projects, normally undertaken to determine the relative economic efficiency of programs." (13) Simply put, economic evaluation is the understanding and use of economic evidence in decision making.

Economic evaluation contributes to evidence-based decision making in public health by helping leaders and the community identify, measure, and compare activities with the necessary impact, scalability, and sustainability to optimize population health (13). In the words of Dr. Thomas Frieden, the Director of the U.S. Centers for Disease Control and Prevention, "to establish an effective intervention package, it is critical to understand the full range of available evidence-based strategies, the size and characteristics of the population to be reached, the projected impact of each intervention, and the estimated cost" (5).

Types of Economic Evaluation and Decision Levels

There are two levels of economic evaluation: partial and full (**Table 1**). Partial economic evaluation measures program or disease costs, but does not involve a comparison with alternative options and does not relate costs to outcomes. Partial economic evaluations include cost-of-illness analysis and program cost analysis. In public health, full economic evaluation compares two or more public health interventions through the examination of costs of inputs and outcomes (14, 15). Full economic evaluations include cost-benefit, cost-effectiveness, and cost-utility analyses (14, 15).

Partial Economic Evaluation

a. *Cost-of-illness analysis* estimates the economic burden or total costs attributable to a particular disease (14, 15). For example, the overall U.S. annual direct medical cost of preventing and treating HPV-associated disease was estimated at $8.0 billion (2010 USD); of this, total about $7.0 billion was spent on routine cervical cancer screening and treatment (16).
b. *Program cost analysis* is a systematic collection and break down of the cost of a program with descriptions of who or what entity incurs which costs (14, 15). For example, the cost of a metformin intervention relative to a placebo intervention was $2,412 per participant, from a societal perspective over 3 years (17).

Full Economic Evaluation

a. *Cost benefit-analysis (CBA)* is considered the gold-standard of economic evaluation because all costs and benefits (and/or consequences – including health outcomes) are converted to a common metric such as dollars (14, 15). CBAs are used to decide among programs with different outcomes (14, 15). For example, the President, Congress, or a governor all might use CBA to decide between investments in health vs. another area. Benefit-cost ratio (BCR) is the summary measure of CBA. A 1.50:1 BCR means for every $1 of cost, society gains $1.50 of benefits (14, 15).
b. *Cost-effectiveness analysis (CEA)* compares the costs with natural health outcome units, such as life-years saved and number of cases averted (14, 15). For example, a cancer prevention program director at a local health agency may need to decide between a number of interventions addressing the same health outcome. CEAs are appropriate to inform the decision because they maintain health outcomes in their natural units rather than monetize the outcome. Cost-effectiveness ratio (CER) is the summary measure of CEA results, and it is expressed in costs per natural health units such as dollars per life-year saved (14, 15). For example, the incremental CER of "Outcome Monitoring plus Recovery Management Checkups" of adults with chronic substance abuse in Chicago is $23.38 per abstinent day and $59.51 per reduced substance-related problem (e.g., liver disease) (18).
c. *Cost-utility analysis (CUA)* is a special form of CEA where the costs and benefits (and/or consequences) are expressed as cost per a standardized morbidity and mortality measure, such as quality-adjusted life-year (QALY) (14, 15). QALY is a single measure of quality of life and survival (15). The summary measure of a CUA is expressed in cost per QALY (14, 15). A CUA is appropriate when making a decision at the agency level, such as the CDC or local health agency, where the director decides between public health interventions with different

TABLE 1 | Types of economic evaluation and decision levels.

Type	Description	Measures	Decision level
PARTIAL ECONOMIC EVALUATION			
Cost of illness analysis	Disease economic burden	Net cost ($)	Public health decision-makers at the local, state, and national levels
Program cost analysis	Net program cost	Net cost ($)	Public health decision-makers at the local, state, and national levels First step to CEA, CUA, and CBA
FULL ECONOMIC EVALUATION			
Cost-benefit analysis (CBA)	Compares different programs with different outcomes (e.g., health vs. other area)	Benefit-cost ratio ($benefit: $cost)	National level and broader perspective, such as the President and Congress (e.g.,: Congress needs to decide between investments in health or investments for another program)
Cost-effectiveness analysis (CEA)	Compares interventions with the same outcomes (ex: between two cervical cancer interventions)	Cost-effectiveness ratio ($per case averted)	Program level (ex: a cancer program director decides to fund one of two possible cervical cancer prevention interventions)
Cost utility analysis (CUA)	Compares interventions with different health outcomes (ex: cervical cancer vs. Alzheimer's disease)	Cost-utility ratio ($per QALY saved)	Agency level (ex: the CDC or a local health agency director decides between funding cervical cancer or Alzheimer's disease interventions)

health outcomes. For example, the cost-utility ratios (i.e., cost per QALY) of population-wide strategies promoting physical activity in adults range from $14,000 to $69,000 per QALY gained (19).

Application of Economic Evaluation in Public Health

Public health economic evidence can be found in The Cost-Effectiveness Analysis Registry from Tufts Medical School, (20) the National Health Services Economic Evaluation Database from the Cochrane Review, (21) and the Community Guide (22). In addition, the CDC's State, Tribal, Local, and Territorial Public Health Professionals Gateway includes a collection of public health economics tools and methods (23). The role of economic evaluation in public health is gaining attention. However, it remains an under-used component of evidence-based public health decision making. In 2012, the Institute of Medicine Committee on Public Health Strategies to Improve Health Board on Population Health and Public Health Practice had some specific recommendations that are a call to action for the use of economic evidence in public health (24). These recommendations were:

- "Develop a model chart of accounts for use by public health agencies at all levels to enable better tracking of funding related to program outputs and outcomes across agencies"
- "Develop a robust research infrastructure for establishing the effectiveness and value of public health and prevention strategies"
- "Develop data systems and measures to capture research quality information on key elements of public health delivery including program implementation costs"
- "Develop and validate methods for comparing the benefits and costs of alternative strategies to improve population health."

Since these recommendations were given, different efforts are underway to improve the use of economic evaluation in public health practice and decision making. Two examples of these efforts are the work done by two public health research networks: the CDC PRC program and the RWJF PH-PBRN.

CDC Prevention Research Centers Program

The PRC program funds through cooperative agreements a national network of 26 academic research centers that are located at either a school of public health or a medical school that has a preventive medicine residency program. The PRCs are committed to conducting prevention research and are leaders in translating research results into policy and public health practice. The evaluation of the 2014–2019 PRC program added data collection to complete cost analysis of the core prevention research projects. As the Director of the CDC PRC program, Dr. Mehran Massoudi believes the cost analysis is important because "as scrutiny over federal spending increases with a greater sense of accountability, the PRC program has the unique opportunity to collect cost data associated with various facets of the PRCs' research projects and in turn allow state and local health departments the ability to consider which components of the research projects can be adapted and or implemented for their use." Dr. Wayne Giles, Director of the CDC's Division of Population Health in the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), added "As we work to improve the health and wellbeing of populations, it is increasingly important that our interventions demonstrate their ability to improve the health and delivery of care to populations while simultaneously addressing costs. Therefore, applied research documenting cost savings and return on investments are of high importance."

The cost analysis will:

- Measure the actual expenditures related to the PRCs' core research project

- Develop capacity of each institution and the PRC program to use economic evidence to assess the PRC's research effectiveness, efficiency, equitability, scalability, and sustainability
- Provide baseline data for further economic evaluation studies, such as cost-effectiveness analysis and cost-benefit analysis.

A systematic collection of costs of a PRC's core research project was done for the Rural Cancer Prevention Center (RCPC) at the University of Kentucky. The KY RCPC found that viewing the 1-2-3 Pap video increased the completion rate of human papillomavirus vaccination in 18- to 26-year-old women in Appalachian Kentucky. A hypothetical adaptation scenario showed that the intervention cost per completed three vaccination series would decrease from the efficacy study cost of $890 per completed series to an estimated implementation cost of $389 per completed series. Implementation cost estimates of the PRCs' core research projects can provide additional evidence to public health practitioners and decision makers when assessing whether to implement and scale-up these projects in their communities.

Dr. Jeff Harris, the Principal Investigator for the University of Washington PRC, believes that "Economic evaluations are quite important for scaling up applied prevention research. In the short-term, public health managers need to know what an intervention will cost. In the long term, they need to know what an intervention will return."

RWJF Public Health-Practice Based Research Network

The PH-PBRN is a nationwide research network composed of local and state governmental public health agencies, community partners, and collaborating academic research institutions. Through the RWJF's Delivery and Cost Studies (DACS) Program, 11 PH-PBRNs are conducting studies to estimate the cost of delivering public health services by examining how characteristics of public health delivery systems (e.g., activity scope, contributing organizations' roles) impact the cost, quality, and equity of public health services delivery. For example, the Colorado PH-PBRN estimated the degree to which local public health structural differences impacted and changed the costs of delivering routine communicable disease surveillance by using a micro-costing economic evaluation method. Results showed that having a dedicated in-house communicable disease employee reduced spending by $138 per day or $50,370 per year.

Conclusion

In todays' economic climate of low resources and funding for public health programs, public health practitioners will benefit from the use of economic evaluations to enhance public health evidence-based decision making. Economic evaluation could provide data to help public health practitioners and decision makers to identify, measure, and compare a project's resource allocation with the project's impact, scalability, and sustainability to optimize population health.

As with epidemiology, economic evaluations are becoming another cornerstone in the foundation of public health decision making. When asked "why are economic evaluations important to public health," Dr. Sam Posner, Associate Director of Science for CDC's NCCDPHP, answered "Evaluation of public health interventions most commonly focuses on the impact on health outcomes and health status. Evaluating health impact is critical; however, it is equally important to conduct economic evaluations of interventions. For public health interventions to result in sustainable change, they need to both be effective in addressing the health burden and be economically defensible."

The health of our population will benefit from assuring that future generations of public health professionals are educated and trained in economic evaluation. Now, and in the future, it is essential for public health professionals to understand and use economic evaluations as part of a comprehensive public health decision-making process.

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Building interdisciplinary leadership skills among health practitioners in the twenty-first century: an innovative training model

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Transformational learning is the focus of twenty-first century global educational reforms. In India, there is a need to amalgamate the skills and knowledge of medical, nursing, and public health practitioners and to develop robust leadership competencies among them. This initiative proposed to identify interdisciplinary leadership competencies among Indian health practitioners and to develop a training program for interdisciplinary leadership skills through an Innovation Collaborative. Medical, nursing, and public health institutions partnered in this endeavor. An exhaustive literature search was undertaken to identify leadership competencies in these three professions. Published evidence was utilized in searching for the need for interdisciplinary training of health practitioners, including current scenarios in interprofessional health education and the key competencies required. The interdisciplinary leadership competencies identified were self-awareness, vision, self-regulation, motivation, decisiveness, integrity, interpersonal communication skills, strategic planning, team building, innovation, and being an effective change agent. Subsequently, a training program was developed, and three training sessions were piloted with 66 participants. Each cohort comprised a mix of participants from different disciplines. The pilot training guided the development of a training model for building interdisciplinary leadership skills and organizing interdisciplinary leadership workshops. The need for interdisciplinary leadership competencies is recognized. The long-term objective of the training model is integration into the regular medical, nursing, and public health curricula, with the aim of developing interdisciplinary leadership skills among them. Although challenging, formal incorporation of leadership skills into health professional education is possible within the interdisciplinary classroom setting using principles of transformative learning.

Keywords: leadership, interprofessional, interdisciplinary, competencies, health professional education

Genesis of Innovation Collaborative on Leadership

Leadership is a complex multidimensional concept that has been defined in many different ways. A visionary leader influences the organizational outlook and has the potential to optimize team performance (1). In the healthcare system, leadership skills are essential to work in a dynamic environment for a minimum acceptable level of healthcare in populations exposed to threats from communicable and non-communicable diseases, to meet the needs of an overstretched public health system and the rising costs of providing healthcare, and to resolve the numerical shortage and poor distribution of healthcare providers globally. Young students who have enrolled in academic programs are the future leaders of healthcare systems. Developing leadership skills among them is of vital importance. The recommendations of the Lancet Commission Report (2), discussing three generations of global education reforms, target a multidisciplinary and systemic approach for health professional education. Transformative learning, the third-generation reform with its focus on the development of leadership skills and interdependence in health education, engages the needs and demands of the twenty-first century health professional education. The purpose of such education reform is to produce progressive change agents in healthcare. The *Future of Nursing* Report (3) also strongly focuses on transformative leadership, stating that strong leadership is critical for realizing the vision of a transformed healthcare system.

Health practitioners have made significant contributions globally to health and development over the past century. Interprofessional education sets the stage for teamwork, and its necessity has grown in importance due to transformational educational reforms and the transforming health systems. Recently, attention has been paid to the concept of interdisciplinary teams working together in healthcare. The elements of collaborative interprofessional practice include commitment to power sharing, distributed leadership, and striving for teamwork (4). The core competencies for interprofessional collaborative practice have been reported by an expert panel in 2011 (5). It stresses the importance of a continuous development of interprofessional competencies by health profession students as part of the learning process, so that they enter the workforce ready to practice effective teamwork and team-based care (5). Although contextualized within the clinical care setting, these competencies are equally important for leadership education in general. It is known that individual reported leadership styles are correlated with leadership outcomes at the organizational level (6). Recent work has also evaluated the impact of a case competition-driven model on development of interprofessional competencies among graduate students and provides a model for assessing interprofessional competency development adapted to non-clinical professions (7).

Recently in India, the lack of and need for healthcare practitioners has been discussed persuasively. The education system for health practitioners in India is compartmentalized with strong professional boundaries among the various health providers (medical, nursing, and public health), with poor coordination between these three academic programs. The current health professional education system in India has minimal focus on the formal development of leadership competencies to address the public health needs of the population. To advance the agenda of interdisciplinary leadership, three institutions in India jointly launched an Innovation Collaborative (IC) with the aim of identifying interdisciplinary leadership competencies in healthcare and develop and pilot an interdisciplinary training model relevant to doctors, nurses, and public health practitioners in India.

Activities of the Innovation Collaborative

Three institutions partnered in this initiative – Public Health Foundation of India, New Delhi (public health institute); the Datta Meghe Institute of Medical Sciences, Sawangi, Wardha (medical school); and the Symbiosis College of Nursing, Pune (nursing school). The Collaborative was commissioned by the Institute of Medicine, Washington, DC, USA, through a systematic, competitive selection process. The Indian IC was the only one selected from Asia and one of four initiatives globally. The main task of the IC was to develop a training model for medical, nursing, and public health practitioners, incorporating the principles of interdisciplinary leadership in their competencies. A core team was formed including members from all three partner institutes. Additionally, a Technical Advisory Group was formed, composed of experts in the field of health professional education, to oversee and provide guidance to the activities of the Collaborative. Regular meetings were held with the TAG members and their guidance was sought on various activities of the initiative.

The initial activity undertaken by the IC was an exhaustive literature search in order to understand the need for and genesis of interdisciplinary leadership competencies as a part of health practitioner education. Published evidence, both global and Indian, was included in the literature search, looking for the need for interdisciplinary training of health practitioners, current scenarios in interprofessional health education, and key interdisciplinary leadership competencies that could be incorporated into the curricula of health practitioners. The literature search strategies included journal articles from electronic databases, medical, nursing and public health journals, gray literature, newspaper articles, and papers presented at conferences. The search was conducted around three thematic areas: (i) general leadership competencies in healthcare, (ii) specific leadership competencies in medical, nursing and public health, and (iii) interdisciplinary leadership competencies. Search terms included "leadership," "leadership competencies," "leadership in health care," "leadership in medical education," "leadership in nursing education," "leadership in public health education," "interprofessional education," and "interdisciplinary leadership." These were used individually as well as in combination. The search was not restricted by the period of publication or language. The electronic search was complemented by hand searching for relevant publications/documents in bibliographies. A process of snowballing was used until no new articles were located. Once the articles were procured, each article was reviewed by a team member for its relevance to the project with appropriate data extracted. The working group subsequently summarized the findings of the search and prepared a formal report, which was reviewed by all the members and then finalized. This was followed by a consultation with experts from various

disciplines of health professional education, where the findings of the literature search were considered.

The next activity of the Collaborative was the development of a training model to be tested subsequently as pilot training sessions. The draft training model was conceptualized based on the findings of the literature search, deliberations, and the recommendations of the expert group at the consultation and other representatives from the three professions. A detailed training manual was developed for use in pilot training by the working group along with the team leads. The long-term objective of this training model was its integration into the regular curriculum of the medical, nursing, and public health programs, with the aim of developing interdisciplinary leadership skills relevant to twenty-first century health system challenges. This was deemed necessary for a positive change in the healthcare system of India, with inclusion of interdisciplinary leadership competencies in the health practitioners' education curricula.

In alignment with the objectives of the IC, the training model was pilot-tested on medical, nursing, and public health practitioners and students across the three professions. A detailed agenda was prepared based on the content of the training manual. The pilot training sessions, held in 2013, were conducted in three clusters.

Outcomes of the Activities

Literature Search

The literature search relating to leadership in the context of healthcare and interdisciplinary leadership competencies yielded abundant information on the subject. It was observed that leadership and management are essential for optimal performance in healthcare, bolstering service delivery and improving outcomes in health systems. Hospitals with improved leadership and management practices experience superior clinical performance, stronger financial positions, and higher patient satisfaction (8). Leadership includes developing the vision of the organization, empowering staff and management, establishing organizational culture and values, and understanding the characteristics of leaders and communication (9).

The current medical curriculum requires restructuring, with an increased focus on key competencies in several domains of public health. Currently, a majority of physicians lacks the technical skills necessary for major leadership/management roles that will enable them to both change and empower the local healthcare service delivery environment (10). Therefore, significant training in leadership skills as part of the medical curriculum is important.

The majority of current nursing education involves acute care while incorporating the skills necessary to negotiate with the healthcare team. As a result, nurses need to attain the requisite competencies to deliver high-quality care, including leadership, health policy, system improvement, research and evidence-based practice, and teamwork and collaboration. While the program for Auxiliary Nurse Midwives in India has limited scope for decision-making, some of the other programs include leadership education in which the staff nurses are empowered to make decisions, manage wards, and delegate assignments.

TABLE 1 | Literature review of key leadership competencies for healthcare practitioners.

Medical doctors (10–16)	Nursing practitioners (17)	Public health practitioners (18)
Emotional intelligence, confidence, humility and creativity as necessary qualities of leaders, teamwork, communication, management, quality improvement, strategic and tactical planning, persuasive communication, negotiation, financial decision-making, team building, conflict resolution, and interviewing	Designing and implementing plans for care of the sick, evidence-based practice, population-appropriate healthcare, clinical decision-making, risk anticipation, accountability for evaluation and improvement of point-of-care outcomes, client and community advocacy, delegation and oversight of care delivery and outcomes, team management and collaboration with other health professional team members, and development and leveraging of resources	Visionary leadership skills, effective change agent, political prowess, negotiation and mediation, ethics, marketing and education, organizational capacity and dynamics, transorganizational collaboration, social forecasting, and team building

Over the years, public health education has largely been restricted to medical colleges as part of the medical undergraduate curriculum. However, lately, a conscious shift in public health education in India has occurred with institutions offering public health programs for medical as well as non-medical graduates, thereby widening the scope of public health education across practitioners from diverse fields. While these practitioners are trained in core public health, training in leadership skills is lacking. The leadership competencies expected from practitioners of each of these three programs are found in **Table 1**.

Improved patient care and population health with reduced cost is a primary target of the modern healthcare system. Health practitioners with different professional backgrounds come together to attain a common goal – patient care. Health systems, patients, and providers benefit when collaboration is practiced. Environments that encourage collaborative partnerships require strong leadership. Interdisciplinary leadership competencies are increasingly essential in the international healthcare environment. Interdisciplinary leadership has emerged from traditional models of leadership that are obsolete in the health reform environment. Leadership styles are often discussed based on behaviors used to influence change. Over the years, several models of interdisciplinary leadership such as transactional, collective, transformational, renaissance, quantum, pluralistic, post-heroic, servant, Zen, and other leadership models have emerged (19, 20).

Interdisciplinary Leadership Competencies

Based on the literature search and the deliberations during the consultation that followed the search, the following core interdisciplinary leadership competencies were identified:

- Be self-aware
- Visionary with a sense of mission
- Self-regulation
- Committed and motivated
- Decisive, courageous, and honest
- Good communication/interpersonal skills
- Influence peers to innovate

- Strategic and tactical planning
- Networking, team collaboration
- Encourage innovation and facilitate transformation
- Set a direction
- An effective change agent and role model

In order to arrive at a common set of competencies for all the three professions, the research team entered into discussions with experts, representatives from the three professions as well as reviewed the literature to identify the functions for these three professions. The core group reviewed the job responsibilities and functions and collated all the functions identifiable as a leadership function. The duplicates were removed and similar functions were merged to build a common list of leadership-related responsibilities. We presented these for suggestions to the technical advisory group and incorporated their suggestions to evolve a set of core leadership competencies. These competencies guided us to develop a training manual incorporating learning objectives that best reflected these competencies.

Interdisciplinary Leadership Training

The literature review findings formed the basis for developing a training model, which was subsequently piloted at three different sites: State Institute of Health Management and Communication, Gwalior (SIHMC); Indian Institute of Public Health, Bhubaneswar (IIPHB); and Datta Meghe Institute of Medical Sciences, Sawangi (DMIMS). The duration of each training session was 3 days. Selectively chosen senior practitioners based in the partner institutions served as resource faculty for the pilot training, actively engaging the participants. The training workshop groups were a mix of participants from different disciplines. The total number of participants across the three cohorts was 66, 26 of which were females. The average age of the participants across all groups was 32 years.

The pilot training workshops included didactic sessions as well as group discussions. The didactic sessions were aimed at giving the trainees an understanding of leadership skills and their importance in healthcare. The group discussions aimed at training them to innovatively apply interdisciplinary leadership competencies in their local healthcare settings. The agenda of the sessions was designed to coalesce the groups so as to form a team with interdisciplinary leadership skills. Details of the training model with topics covered are provided in **Table 2**.

At the end of each of the training sessions, the trainees were asked to provide feedback regarding various aspects of the program. Many positive responses from the participants were received, ranging from good coordination of the training, beneficial content, diverse and relevant pedagogy, to a friendly atmosphere. A few negative points, such as short duration of the training, theoretical sessions, and less group discussions/practicum were also emphasized in the responses. Based on the feedback of the trainees, the training model was revised. The duration of the training was increased to 4 days. Certain topics, such as Ethics of Leadership, Advocacy, Conflict Resolution, Negotiation, and Interpersonal Communication, were added to the program. The program was revised to include more group discussions, role playing, videos, and innovative themes such as the World Café. The revised model was shared with members of the Technical Advisory Group and finalized after their input.

TABLE 2 | Agenda and pedagogy of the pilot interdisciplinary leadership training.

Timings	Activity	Pedagogy
DAY 1		
0930 to 1300	Introductions and sharing of leadership training experiences Objectives of training program Program schedule Expectations of participants Project background: interdisciplinary leadership skills among health practitioners in the twenty-first century	Each participant was given a card to note down their leadership experiences and expectations, followed by introductions and a brief overview of the program by the training coordinator
1300 to 1400	Lunch	
1400 to 1700	What is leadership? Characteristics of leadership Leadership styles	These sessions were didactic, followed by group discussions
DAY 2		
0930 to 1300	Interview with guest speaker (focus on leadership qualities and challenges), Discussion	A senior health professional, who has previously worked in a leadership position, was invited and interviewed by some participants. Questions during the interview included his experiences as a leader, challenges he faced, coping mechanisms, etc.
1300 to 1400	Lunch	
1400 to 1700	Motivation Time management	Case studies discussed with the participants Didactic session followed by group discussion
DAY 3		
0930 to 1300	Managing an organization Team building	Role play, followed by group discussion A movie highlighting the importance of team building was shown to the participants, followed by a group discussion
1300 to 1400	Lunch break	
1400 to 1500	Concluding session	Each participant was asked to correlate his/her expectation from the first day and what was learnt during the 3-day training and give general feedback regarding the training

Following the structure adopted for the pilot training and incorporating the lessons learned from them, further rounds of training workshops on leadership and its relevance in the health and development sectors continue to be conducted regularly to propagate the agenda of the IC. Participants of these training workshops include practitioners from the health and development sectors, such as medical, nursing, program management, public health organizations, academicians, consultants, and practitioners from the industrial sector.

Way Forward

Leadership is not only about being seen as the leader but also about developing the personal qualities required to work effectively with others, hence learning to work within teams and developing followership skills are essential values of interdisciplinary leadership (21). In the field of healthcare in India, interdisciplinary leadership is still at a nascent stage. The current curricula for medical, nursing, and public health education do not adequately provide for formal training in individual or interdisciplinary leadership skills. Although healthcare is a sector where interdisciplinary teams are expected to function to serve a common goal – patient care, it is very often observed that the medical, nursing, and public health professions tend to work in silos, with one group tending to overpower the others. The *Future of Nursing* Report recommends a strong and committed partnership of nursing practitioners with physicians and other health practitioners in building leadership competencies to develop and implement the changes required to increase quality, access, and value and deliver patient-centered care (3). Health systems, patients, and providers benefit when collaboration is practiced. Healthcare organizations that have competent clinical leaders tend to have greater staff engagement, better performance, and higher quality of care with improved outcomes (22).

Need for Leadership Skills

Increasing coverage of priority health services requires additional resources and good leadership is vital to using these resources effectively to achieve measurable results for positive system change (23). Primary healthcare demands equal participation and responsibility from all team members with leadership shifting between practitioners determined by the nature of the problem to be solved. Although medical education may be the most suitable opportunity for building leadership skills among physicians, the nursing and public health education systems must also be considered for reforming their respective curricula. This provides an opportunity to incorporate leadership competencies in the curricula for the development of health leaders (14). In times of change, a leader is needed, who can take initiative and responsibility, influence many different disciplinary groups, design new ways of working, be a pioneer, and follow a different and vibrant vision. McKinsey and Company states that leadership development can fundamentally change the way health systems work, provided the basic four principles of leadership are adhered to: (i) leadership development must form the backbone of a health system transformation, not merely serve as its complement, (ii) it must follow an overarching plan, (iii) it must strengthen who leaders are, not just what they do, and (iv) senior system leaders must sit in the center of leadership development, spearheading the leadership development effort, and not sit on the sidelines (24).

Interdisciplinary Leadership in the Indian Context

Interprofessional team leadership is a prerequisite in healthcare settings as much in India as it is globally. For this, continuous efforts on the part of multiple stakeholders are vital for transforming the current status by creating and testing different models of interprofessional practice. Interprofessional education, training, and practice can make a positive difference by promoting a reflective practice environment that can generate and encourage shared knowledge (4). Achieving leadership skills by "work experience" or "on the job" is demanding. Since leadership is deemed to be relevant at all levels, leadership development must be addressed throughout the education and training undertaken by health practitioners – medicine, nursing, and public health, and sustained on the job.

Leadership skills are not yet being optimally included in health professional education in India. Leadership competencies, although essential, compete with the requirement for higher clinical competencies within the curricula, thereby posing a challenge in the acquisition of leadership competencies. Unlike United States, where the Core Competencies for Interprofessional Collaborative Practice suggests interprofessional team building and leadership as one of 11 identified competency area for clinicians, there is no such contextual document that outlines interdisciplinary leadership competencies in India (5). There is limited experience even in the assessment of such interdisciplinary competencies. Carlton et al. have suggested a model for assessing interprofessional competency development adapted to non-clinical professions (7). Although they have not used this model specifically for non-clinical competencies and not for leadership competencies, there is potential for using this model to assess interdisciplinary leadership competencies for health professionals.

The actual needs and current demands of the public health systems in India and most developing countries are at odds with embracing these educational reforms. At present, the health professional education curriculum in India does not include leadership competencies to strengthen health systems and to address the health challenges of the new century. A framework of leadership competencies for health professional education in the Indian context may be drawn from global knowledge and experiences but must be relevant to local context. India needs an empirical model of leadership competencies for health professional education that can be employed to further interdisciplinary leadership within the complexities integral to the health system.

Recommendations

To comprehensively address these leadership issues, healthcare requires significant reforms in health professional education. Competencies such as self-awareness, self-regulation, commitment, motivation, enthusiasm, empathy, social skills, decisiveness, courage, and integrity emerge as universal set of requirements, which can be learned and developed. While these skills are mainly in use in management circles currently, they should prove to be central and beneficial to the healthcare organization's strategic action plan. However, further research is warranted to validate

the role of these interdisciplinary competencies. Potential areas for research can include impact of the introduction of this leadership training on improving organizational and population outcomes. Since these competencies are contextualized for interdisciplinary work, further research is desirable to assess sustainable individual and organizational gains in case of changes in the team composition within the healthcare settings. We have assumed that a common set of leadership competencies is applicable across all these three professions. While a case for a common set of leadership competencies for doctors and nurses in clinical care may be easier to accept, there is a greater divergence of functions of public health professionals within countries.

Although the duration of the training conducted was short, it was well received by the participants. The pilot training demonstrated the need for interdisciplinary leadership competencies in the field of healthcare. Although at an embryonic stage, the demand for additional training reflects the desire among the younger healthcare practitioners for collaborative leadership. The current lack of progress in advancing interprofessional collaboration strongly suggests that academic and health practitioners' reluctance in accepting that concept that interprofessionalism will improve coordination of health services, better use of specialist resources, and provide improved health outcomes. When the benefits provided through interprofessional collaboration are more widely accepted, then a breakthrough may be reached (4). Formal incorporation of leadership skills in health professional education is possible within interdisciplinary classroom settings using the principles of transformative learning. The adoption of a case-based learning that encourages participation of students from diverse disciplines has a potential for enhancing acquisition of interdisciplinary competencies (7) and needs further examination in the leadership context.

Ethical Considerations

The authors did not interview or collect any data from the participants as a part of this activity. This activity only included undertaking a literature search and piloting of short 3-day interdisciplinary leadership training workshops by developing training materials. There was no component of primary research that was planned as part of the work. Therefore, an ethics approval was not required for this activity.

Author Contributions

PN, HN, KS, and SZ contributed to the design and development of the project; collection, compilation, and interpretation of data for the project; drafting the article and revising it for important intellectual content; finalization of the version to be submitted for publication; and agree to be accountable for the article. RT contributed to collection and compilation of data; drafting the article; approval for finalization of version to be submitted for publication; and agree to be accountable for the article. ZQ, AG, JN, MG, and RY contributed to the design and development of the project; collection and compilation of data; drafting the article; approval for finalization of version to be submitted for publication; and agree to be accountable for the article.

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Putting public health ethics into practice: a systematic framework

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It is widely acknowledged that public health practice raises ethical issues that require a different approach than traditional biomedical ethics. Several frameworks for public health ethics (PHE) have been proposed; however, none of them provides a practice-oriented combination of the two necessary components: (1) a set of normative criteria based on an explicit ethical justification and (2) a structured methodological approach for applying the resulting normative criteria to concrete public health (PH) issues. Building on prior work in the field and integrating valuable elements of other approaches to PHE, we present a systematic ethical framework that shall guide professionals in planning, conducting, and evaluating PH interventions. Based on a coherentist model of ethical justification, the proposed framework contains (1) an explicit normative foundation with five substantive criteria and seven procedural conditions to guarantee a fair decision process, and (2) a six-step methodological approach for applying the criteria and conditions to the practice of PH and health policy. The framework explicitly ties together ethical analysis and empirical evidence, thus striving for evidence-based PHE. It can provide normative guidance to those who analyze the ethical implications of PH practice including academic ethicists, health policy makers, health technology assessment bodies, and PH professionals. It will enable those who implement a PH intervention and those affected by it (i.e., the target population) to critically assess whether and how the required ethical considerations have been taken into account. Thereby, the framework can contribute to assuring the quality of ethical analysis in PH. Whether the presented framework will be able to achieve its goals has to be determined by evaluating its practical application.

Keywords: public health practice, health policy, ethics, program evaluation, ethical theory

BACKGROUND

Public health ethics (PHE) is a relatively new field of applied ethics, and is concerned with the moral implications of a diverse range of activities aiming to protect or improve population health. It is an interdisciplinary field that has to take into account both moral *and* factual considerations, in health policy and health sciences. PH practice differs considerably from medical practice: while the latter is primarily concerned with the health of individual patients, the former focuses on the health of populations. Protecting and promoting health and preventing diseases constitute the primary objectives of PH interventions, rather than treating sick individuals. Often, collective efforts of the community are required to achieve PH goals. Last but not least, it has been questioned whether the prevailing liberal approach to medical ethics is appropriate for the field of PH (1). It is therefore widely acknowledged that ethical inquiries in PH need a different approach than traditional biomedical ethics (2, 3).

To arrive at transparent, consistent, and justified results, ethical analysis in PH should follow a clearly defined methodological approach. Any framework for PHE thereby has to meet at least two fundamental requirements: (1) as a tool for normative inquiry, the framework must be based on an *explicit ethical justification*. This is a requirement of any ethical analysis: normative claims about what is morally acceptable must be justified by an underlying ethical theory or at least an explicit ethical approach. A transparent normative basis allows those who act upon the analysis (e.g., PH professionals) and those who are affected by the analysis (e.g., the target population) to assess the validity of the resulting claims. (2) A framework for PHE should provide practical guidance for the various people working within or related to the field of PH. It therefore should include a *methodological approach* that relates the general normative considerations such as ethical norms, values, and principles and the available empirical evidence to concrete PH interventions, programs, or policies.

Several PHE frameworks have been developed over the last years [for some recent reviews, see Ref. (4–6)]. They differ with respect to their theoretical foundations, the selection of normative principles, and the practical guidance (6). So far, none of these frameworks has won universal approval as the go-to ethical framework in the field of PH – which may also be due to the

fact that PHE is still a rather new field of inquiry. In addition, none provides a fully elaborated account of the two necessary ingredients of a PHE framework noted above, comprising both a clearly defined *ethical foundation* and a *methodological approach*. Some frameworks present a set of ethically relevant questions or points to consider without explicitly defining the normative basis, i.e., the underlying ethical principles and their justification (2, 7). Other frameworks comprise ethical principles for evaluating PH interventions, but fail to explain in more detail how these principles should be applied to evaluate particular interventions (3, 8). Childress et al. present a set of general moral considerations, i.e., an explicit normative foundation, and address some practical questions related to specifying and weighting the general moral considerations and resolving conflicts among them (9). While this certainly enhances the practical utility, it does not comprise a more comprehensive methodological approach that can guide – step by step – the ethical planning, conduct, and evaluation of PH policy.

In this article, we first outline what the preconditions and advantages of a *systematic* framework for PHE are. Building on and combining prior work in the field, we then present a systematic framework for addressing ethical issues in the field of PH that tries to satisfy both the foundational and methodological requirements. The framework comprises (1) an explicit *normative foundation* with five substantial ethical criteria and seven procedural conditions guiding a fair decision process, and (2) a six-step *methodological approach* for applying the ethical criteria and conditions. We have developed the framework primarily to provide practical guidance to those who want to analyze the ethical implications of PH practice including academic ethicists, health policy makers, health technology assessment bodies, and – last but not least – PH professionals.

WHAT MAKES A FRAMEWORK FOR PHE SYSTEMATIC?

In a PHE framework, both the selection of relevant ethical norms and principles and their application to a public heath program should be performed in a systematic way. The *selection* can be considered systematic if it follows a defined methodological approach to identify a comprehensive list of relevant ethical norms and principles that should be considered in every ethical analysis of PH practice [see e.g., Ref. (3, 8, 9)]. Any modification of the normative foundation by changing, adding, or omitting ethical considerations must be explicitly justified. Furthermore, the *application* of the ethical norms and principles to a certain PH program or issue can be considered systematic if it follows an explicitly defined process [see e.g., Ref. (2, 7, 9)]; again, any deviation from the procedure should be justified.

Using a systematic approach to PHE has several advantages:

(1) It reduces the risk that the evaluation neglects relevant ethical considerations or an important methodological step (10).
(2) It allows an explicit assessment of the process quality of a PHE analysis by checking whether the relevant norms and principles have been considered and whether the required methodological steps have been completed.
(3) It enables health policy makers, PH professionals, and members of the target population to assess whether the relevant norms and principles have been considered (11), whether and why they have been modified, and whether all methodological steps have been completed.
(4) It promotes a more explicit understanding among PH students and professionals what it means to assess the ethical implications of PH interventions.

Overall, a systematic framework to PHE has the potential to increase the quality of ethical analysis and reflection in the field of PH.

THE NORMATIVE FOUNDATIONS

As it is one of the fundamental goals of PHE to provide normative guidance in the field of PH, the framework must be grounded in an ethical theory or at least ethical approach that provides a justification of the selected principles and norms. However, there is intractable disagreement about which ethical theory is correct. Moral philosophy is characterized by a multitude of competing approaches that differ significantly in their justificatory strategies and PHE frameworks vary considerably with respect to their philosophical foundations (6). According to consequentialist theories, for example, the action or policy that has the best consequences is morally right (in utilitarianism the action that maximizes overall utility), irrespective of the resulting distribution. According to deontological theories, by contrast, moral obligations and individual rights determine which action is ethically mandated (e.g., to respect individual autonomy). As a consequence, the results of ethical analyses will vary considerably depending on the underlying ethical theory.

An alternative approach that explicitly acknowledges the complexity of normative orientations in modern pluralistic societies is the coherentist model of justification, which has been introduced as "reflective equilibrium" by John Rawls (12). In our view, it is also the most promising model for PHE (9). Unlike classical ethical theories, coherentism does not build on a single foundational moral principle, but rather starts with considered judgments, i.e., moral convictions and beliefs that we hold in our everyday life, and develops a *coherent* framework by specifying, testing, and revising them. The goal is a "reflective equilibrium" of theoretical assumptions, moral principles, and judgments about single cases. The four principles beneficence, non-maleficence, respect for autonomy, and justice, for example, are internationally recognized as a coherentistically justified set of moral principles for the field of biomedicine (13).

The principles that have been developed from considered judgments represent *prima facie* binding moral norms that must be followed unless they conflict with equally strong or stronger obligations. Moreover, they provide only general ethical orientations that require further content to give guidance in concrete cases. Thus, in application, the principles have to be specified and – in case of conflict – balanced (see below: methodological approach).

A coherentist model of justification has several advantages: despite unresolved foundational issues, it allows us to find consensus on the level of *prima facie* binding mid-level principles, since they build on our everyday moral convictions and are compatible with various ethical justifications. At the same time, it makes moral controversies more transparent, since they can be analyzed as conflicts between principles with different weights. Identifying

precisely the type of ethical conflict is often the first step toward a solution.

Based on the coherentist model of justification, we have developed a normative foundation for PHE that contains five substantive ethical criteria (see Substantive Normative Criteria) and seven procedural conditions (see Procedural Conditions for a Fair Decision Process).

SUBSTANTIVE NORMATIVE CRITERIA

Table 1 presents the substantive normative criteria that should guide ethical analysis in PH based on a coherence approach of justification (see above). They are linked to the specific characteristics of the field of PH, thereby taking into account that PH focuses on populations rather than individuals, works preventively rather than curatively, and usually requires action at the population rather than the individual level (1). Many ethical principles and considerations relevant for PH have already been elaborated over the last several years [cf. the reviews Ref. (4–6)]. As "considered judgments" about what is morally important in PH, they constitute the basic ingredients of our coherentist approach and are reflected – explicitly or implicitly – in our list of normative criteria. They are justified by more basic ethical principles including maximizing health benefits, preventing harm, respecting autonomy, or promoting justice. The order of the criteria is determined by the sequence of their application. First of all, the benefit of the intervention has to be established. Without an expected benefit, the intervention should not be implemented and there is no need to apply the other criteria. After assessing expected benefits and potential harms of the intervention, implications on individual autonomy, distributive justice, and efficiency can be evaluated. It is important to realize that this set of criteria constitutes only the starting point of any ethical analysis. Before applying the criteria, evaluators have to assess whether all criteria are relevant to the PH intervention or policy decision, whether further criteria have to be taken into consideration and whether the criteria require further specification for the application domain.

Table 1 | Substantive normative criteria for ethical analysis in public health.

	Normative criteria
1	*Expected health benefits for the target population*
	• Range of expected effects (endpoints)
	• Magnitude and likelihood of each effect
	• Strength of evidence of each effect
	• Public health (practical) relevance of effects
	• Incremental benefit compared to alternative interventions
2	*Potential harm and burdens*
	• Range of potential negative effects (endpoints)
	• Magnitude and likelihood of each negative effect
	• Strength of evidence for each negative effect
	• Public health (practical) relevance of the negative effects
	• Burdens and harms compared to alternative interventions
3	*Impact on autonomy*
	• Health-related empowerment (e.g., improved health literacy)
	• Respect for individual autonomous choice (e.g., possibility of informed consent, least restrictive means)
	• Protection of privacy and confidentiality (e.g., data protection)
4	*Impact on equity*
	• Access to the public health intervention
	• Distribution of the intervention's benefits, burdens and risks
	• Impact on health disparities
	• Need for compensation?
5	*Expected efficiency*
	• Incremental cost-benefit/cost-effectiveness ratio
	• Strength of evidence for expected efficiency

1. What are the expected health benefits of the intervention for the target population?

An ethical evaluation of a PH intervention must start with assessing its expected benefit. This requires defining the goals of the intervention with the range of expected effects. These can be surrogate endpoints, e.g., the identification of cancer in its early stages or more patient-oriented endpoints, e.g., lowering the cancer-specific mortality rate. The magnitude and likelihood of the effect should be quantified (e.g., reduction of the morality rate for breast cancer from 4/1000 to 3/1000 in the next 10 years through mammography screening for healthy 30-year-old women) (14). In addition, the validity of the available evidence is relevant. Are the underlying studies randomized-controlled trials or retrospective cohort studies? How adequately have the studies been implemented and published [e.g., selective reporting of study findings on the health-related effects of smoking (15)]? Besides *internal* validity (the credibility of the results for the study sample), the *external* validity of the demonstrated effect is also relevant. The external validity concerns the credibility of the results outside of the study sample and thus indicates how generalizable the results are. Only if a *relevant* health-related effect can be demonstrated or justified on the basis of sufficiently *valid* study results, does it make sense to speak of "benefits" of a certain PH intervention. The intervention-specific, health-related benefit should be higher than the potential benefits of alternative interventions, thereby providing an *additional* benefit for the target population.

An expected benefit can seem plausible even if the underlying evidence is not of the highest desirable internal and external validity. In this case, it is necessary to explicitly state the reasons for the lack of suitable data and the arguments why it nevertheless seems appropriate to implement the intervention. This transparency is a necessary prerequisite for dealing appropriately with the frequently uncertain demonstration of benefits in the field of PH (16, 17).

The necessity to review alternative PH interventions to achieve the same goal is not just an imperative of instrumental rationality and the principle of benefit maximization, but also allows us to identify any alternatives that might be ethically less problematic – e.g., by being less restrictive on individual autonomy (see third principle).

2. What are the potential burdens and harms of the intervention?

Oftentimes, beneficial PH interventions are associated with social and health risks and burdens (e.g., false positive findings with consecutive unnecessary interventions in the case of cancer screening). For this reason, it is important to assess not only potential benefits

but also potential harms. Potential harm should be assessed for those directly and indirectly affected and be compared with the expected benefit for the target population to determine the net-benefit. Analogous to the expected benefit, the magnitude, likelihood, and scientific validity of the potential harm need to be assessed [cf. Ref. (18)]. It is one of the central goals of the ethical assessment to recommend suitable measures for reducing the – often unavoidable – risk of harm for the individual as much as possible.

In summary, (i) the practical relevance of the different endpoints (e.g., decreased cancer-related mortality vs. improved early detection of cancer), (ii) the magnitude and likelihood of the effects, and (iii) the scientific validity of the demonstrated effects plays a crucial role in the ethical evaluation of a PH intervention. The controversy among experts on the benefits and harms of mammography screening exemplifies how differently these three aspects can be assessed in a single intervention (19) and how these differences affect PH decision making.

After balancing benefits and harms of the intervention, we can determine whether overall there is a "net-benefit" or "net-harm." Only if there is a (sufficiently valid) actual or expected net-benefit does it make sense to continue the ethical evaluation.

3. How does the intervention affect the autonomy of the individuals in the target population?

The ethical principle *respect for autonomy* is relevant to PHE in two ways. First, PH interventions can and should (if possible) improve the health literacy and competence of the target population (20–22). For this purpose, it is necessary to provide, among other things, high-quality information about the type of intervention and its potential benefits and harm, adapted to the needs of people with different knowledge, capabilities and ways of accessing information (23, 24). Second, in light of the usually unavoidable burdens and risks, individuals should generally be able to decide themselves about their participation in a certain PH program after being sufficiently informed (informed consent). If individual informed consent to participation is not possible (e.g., tab water fluoridation), there should be a democratically legitimate public decision process about the implementation of the PH intervention.

If certain PH goals can only be achieved effectively by influencing or even restricting individual freedom of choice (e.g., incentive systems, legal obligations, or quarantine interventions), this requires a special justification. In particular, it has to be demonstrated that the PH goal cannot be achieved with a less restrictive or less manipulative intervention (25). As a general rule, restrictions should be minimized (9). For example, before legally mandating a PH intervention, there should be an attempt to achieve sufficient participation by non-coercive incentives. The fact that a less restrictive intervention might forfeit a potential health benefit for the population is not *per se* an argument for more restrictive interventions. The expected health benefit rather has to be balanced against the potential social harm (restriction of freedom, protection of privacy, or stigmatization).

4. Impact on equity: how are benefits and burden distributed?

Public health interventions often have an impact on the distribution of health outcomes and therefore the opportunities that citizens are offered in a society (26). For reasons of *equity*, therefore, all people who might benefit should have equal access to a given PH intervention. Both financial and non-financial barriers to access have to be taken into account. In addition, the distribution of potential benefits and harm has to be examined. PH interventions should contribute to reducing existing health inequalities. For example, interventions can be tailored to the needs of health-disadvantaged groups (while avoiding possible negative social consequences like stigmatization).

When PH interventions accept a potential harm for certain subgroups to achieve a significant expected benefit for another subgroup, strategies to compensate for these risks have to be considered for the sake of compensatory justice. For example, people placed under quarantine need to be given appropriate psychological support and their captivity should be alleviated as well as possible beyond the regular standard of care in hospitals. Another example concerns health professionals exposed to an increased risk of infection by their patient contact during a pandemic (e.g., SARS): they should be compensated by an independent fund to cover their illness or absence from work (27).

5. Expected efficiency: what are the costs and opportunity costs of the intervention?

In the light of limited public resources, the *efficiency* of a PH intervention has to be assessed. This requires determining the incremental cost–benefit ratio, i.e., the ratio between additional costs and additional benefit compared to alternative interventions (if available). The type of benefit and harm entering into the net-benefit of the PH interventions has to be explicitly defined. As with the potential benefit and harm, the internal and external validity of the efficiency assessment have to be evaluated. Determining the *incremental* cost–benefit ratio presupposes reviewing the alternative (if any) strategies to achieve the same PH goals.

PROCEDURAL CONDITIONS FOR A FAIR DECISION PROCESS

Since PH interventions have an impact on the well-being and autonomy of individuals and often require collective efforts, they should be implemented by a *legitimate* decision-making authority within a fair process. Even reasonable and fair-minded people often come to different conclusions in the face of complex moral deliberations. Among other things, this is due to the fact that many evaluations – e.g., of health-related benefits – can only be made on the basis of substantial visions of a good or fulfilled life. How can we make *legitimate* decisions under these conditions of moral controversy? Norman Daniels argues that we have to supplement the general substantive principles of justice with a fair decision process that "holds decision makers accountable for the reasonableness" of their decisions (26). "Accountability for reasonableness" requires four procedural conditions of fairness: transparency (*publicity condition*), reasonable explanation (*relevance condition*), openness for revision (*revision and appeals condition*), and the regulation of adherence to the other three conditions (*regulative condition*) (26). We suggest adding consistency, participation, and managing conflicts of interest (28–30), so that any ethical analysis of PH interventions has to assess how far the seven conditions for a fair decision process described in **Table 2** are met. Further conceptual research is necessary to develop quality criteria for the practical

Table 2 | Conditions of a fair decision process.

Conditions for a fair decision process		
1	Transparency	Decision process including database and underlying normative assumptions should be transparent and public
2	Consistency	Application of the same principles, criteria and rules across different public health interventions → equal treatment of different populations
3	Justification	Decisions should be based on relevant reasons, i.e., based on the normative criteria for PHE (**Table 1**)
4	Participation	Populations affected by the PH intervention should be able to participate in the decision about the implementation
5	Managing conflicts of interest	Decisions about PH interventions should be organized so as to minimize any existing and manage any remaining conflicts of interests of decision makers
6	Openness for revision	Implementations of PH interventions should be open for revision (e.g., if data basis changes or certain aspects have been neglected)
7	Regulation	Voluntary or legal regulation should guarantee that these conditions for a fair decision process are met

implementation of the seven conditions (e.g., what determines a high quality, reasonable explanation?). Further empirical research is necessary to evaluate the feasibility as well as the intended and unintended effects of the seven conditions (31). The results may help to determine more specific guidelines on the adequate implementation of the seven procedural conditions in the practice of PH (32–34).

METHODOLOGICAL APPROACH TO PHE

After having laid out substantive ethical criteria and conditions for a fair decision process, we now present a step-by-step methodological approach that shall guide the ethical evaluation of a given PH intervention in the different phases of its development, implementation, and evaluation.

1. Description of the public health intervention

Any ethical analysis must start with a thorough characterization of the PH intervention, the context in which it will be applied, and possible alternative interventions to achieve the PH goal that might minimize potential negative impact on PH, individual autonomy, equity, or efficiency.

2. Specification and modification of the normative criteria

After describing the PH intervention, the normative basis of the evaluation needs a critical review: do the normative criteria (cf. **Table 1**) require further specification or even supplementation for the PH intervention? The practical relevance of each principle should be clarified, starting with a concrete statement of the content and scope of the principle for the PH intervention at hand. Different policy makers or evaluators may arrive at different specifications with potentially different results in the analysis. While this cannot be eliminated completely, using this explicit framework at least requires the evaluators to explicitly define and justify the specifications so that the underlying sources of disagreement become transparent – and thereby open to revision.

In practice, the five normative criteria (**Table 1**) are often given unequal consideration. For example, an investigation might focus more on balancing expected benefits (criterion 1) with the restrictions of autonomy (criterion 3), while neglecting equity implications (criterion 4). In the ethical debates on mammography screening, equity is often overlooked, despite the screening's high costs (35) and the well-known disparities in breast cancer outcomes between racial and ethnic groups (36). Similarly, many criticisms of national pandemic plans make some effort to apply criteria 1–3 but do not explicitly consider criteria 4–6 (37, 38).

3. Evaluation of the public health intervention using the specified criteria

In the third step, each of the specified normative criteria is used to evaluate the PH intervention. The evaluators must ask, for example: what are the expected benefits of the intervention? What are the program's implications for the autonomy of members of the target population? A step-by-step assessment can reveal currently unresolved controversies and identify the need for further conceptual or empirical studies.

4. Synthesis: overall evaluation of the public health intervention

The fourth step requires compiling each assessment from the previous step into an overall evaluation of the PH intervention. This involves identifying conflicts between the criteria and balancing the conflicting ethical obligations. Balancing requires finding convincing reasons why one criterion or the other should prevail. Being explicit about the reasons that determine the relative weights of the conflicting criteria creates transparency and allows a revision of the balancing by challenging the underlying reasons. For example, there might be good reasons to doubt the validity of the information considered in a particular case or competing information might be available.

The balancing of conflicting ethical obligations shall be illustrated by two examples:

Example 1: in considering a quarantine of a tuberculosis patient, we have to balance respect for autonomy (criterion 3) and protecting others from the risk of a transmitted tuberculosis infection (here: criterion 1). The severity and high likelihood of the anticipated harm to others could be a good reason to assign more weight to protecting others than to the freedom of the infected patient.

Example 2: despite empirical evidence indicating that influenza vaccination of health care personnel (HCP) in long-term care facilities may reduce the residents' all-cause mortality and morbidity (39), vaccination rates remain rather low thus raising the question whether mandatory vaccination policies should be implemented. Here, the ethical conflict lies between the expected benefits for the long-term care residents (criterion 1) on the one side and the potential burdens and risks by the influenza vaccination for the HCP (criterion 2) and the HCP's restriction of

freedom of choice (criterion 3) on the other side. To balance the conflicting criteria, we have to assess the relative weight of the arguments (40): the benefit for the target population – 5 prevented deaths per 100 residents in one study (41) – seems to be rather large compared to the burdens and risks for the HCP due to the influenza vaccination and the restriction of freedom of choice. However, the available studies could not prove a significant effect on the primary outcome, i.e., a reduction of the mortality and morbidity caused by a laboratory proven influenza infection (39), which somewhat weakens the beneficence-based arguments in favor of a mandatory vaccination policy (for more details see Ref. (42)].

The latter example points to another important ethical consideration in the synthesis: before implementing a PH intervention that involves a conflict between the normative criteria, it is important to carefully look for alternative strategies to achieve the PH goal that are ethically less challenging. For example, if a PH intervention is particularly effective but requires a significant restriction of individual autonomy, it should be investigated whether a less restrictive intervention could lead to satisfactory results, perhaps at the price of a somewhat reduced effectiveness. Before implementing a mandatory influenza vaccination policy for HCP, for example, it has to be shown that information or incentive based programs have failed to reach sufficiently high vaccination rates to effectively protect the elderly residents (42, 43), especially in light of the somewhat limited evidence on the vaccination's *specific* effect on mortality and morbidity in the target group.

5. Generating recommendations

In most cases, the overall ethical evaluation will not result in a clear-cut rejection or endorsement of the PH intervention, but rather in a stronger or weaker recommendation, for example, to implement or – in the cases of a negative evaluation – forgo the intervention (see **Table 3**). Rather, it will identify various aspects and conflicts that have to be considered from an ethical perspective. In these cases, the evaluation should be translated into recommendations on how to maximize the intervention's expected benefits and minimize the expected costs (e.g., expected social and health-related harms, restrictions of autonomy). For example, the recommendation concerning influenza vaccination of HCP could be the following: before implementing mandatory programs, further evidence on the vaccination's specific effects and the proof that information and incentive based programs have failed are required (42). And if mandatory vaccination policies are considered, the HCP should be involved in the decision-making process (cf. criteria 4, **Table 2**).

6. Monitoring

After successful implementation, any PH program should be followed-up and monitored in regular intervals to assess (1) whether the ethical evaluation was adequate, (2) whether there are new ethical issues arising, and (3) whether the recommendations are followed and whether they are effective in assuring an ethically appropriate execution of the PH program. For example, vaccination prioritization plans for a pandemic with "magnitude of risk" as one prioritization criterion should be re-evaluated when empirical data about the "real" risks of the pandemic are available. Or: mandatory vaccination policies should be evaluated whether they really have an additional benefit on the mortality and morbidity of elderly long-term care residents compared to voluntary programs. Furthermore, HCP's attitudes toward the mandatory policy should be investigated by socio-empirical studies to assess how the HCP feels about the infringement of their autonomy.

Another example for the demand of monitoring the follow up and the effects of ethical recommendations is the following: there is a broad consent that mammography screening becomes more ethical if participants are adequately informed about potential benefits and harms of the screening procedure itself. The ethical analysis, however, should not stop with the recommendation to inform adequately but should be bound to the necessity of quality assessments with respect to the information process and its results (24, 44).

Table 3 | Methodological approach for putting PHE into practice.

	Step	Task
1	Description	Describe the goals, methods, target population, etc., of the PH program
2	Specification	Specify or supplement (if necessary) the five normative criteria for the PH intervention
3	Evaluation	Evaluate the PH intervention based on each of the 5 normative criteria (cf. **Table 2**)
4	Synthesis	Balance and integrate the 5 single evaluations of step 3 to arrive at an overall evaluation of the PH intervention
5	Recommendation	Develop recommendations for the design, implementation, or modification of the PH intervention
6	Monitoring	Monitor and re-evaluate the ethical implications in regular time intervals

LIMITATIONS

We have developed the framework primarily to provide *practical guidance*. The transparent, systematic approach will enable those who implement a PH intervention and those affected by it (i.e., the target population) to critically assess whether and how the required ethical considerations have been taken into account. Thereby, the framework can contribute to assuring the quality of ethical analysis in PH. The results of the evaluation can then be the basis for political decisions on several levels in the health care system and society about the implementation of PH interventions. While it is not the primary goal of the framework to provide guidance for these political processes, some of the ethical requirements will also apply: especially, the conditions of a fair decision process (cf. **Table 2**) should also be met in the political sphere of decision making – which currently is often not the case.

Whether the presented framework will be able to achieve its goals has to be determined by practical application: are all necessary normative considerations concerning substantive justification and procedural fairness included in the framework? Does the

methodological approach provide a useful tool for evaluators of PH practice? Applying the framework to further examples of PH interventions will shed more light on its strengths and weaknesses. The framework itself requires critical monitoring by scholars and practitioners in the field of PH.

SUMMARY

There is an increasing need for assessing the ethical implications of PH practice. While several approaches have been published over the last decade, none of them give a complete account of both the normative foundation and the methodological approach. Based on a coherentist model of justification, we set out here a systematic framework for ethical analysis in PH that includes (1) an explicit normative foundation with five substantial criteria and seven procedural conditions and (2) a six-step methodological approach for applying the normative considerations to concrete PH interventions. Thereby, the framework explicitly ties together ethical analysis and empirical evidence: ethical consideration is not merely an "add-on" to empirically data. Rather, normative questions about the effectiveness, benefits, or harms of a PH intervention can only be answered by reference to the evidence from empirical studies. In this respect, the framework strives for evidence-based PHE.

AUTHOR CONTRIBUTIONS

GM and DS conceived of the manuscript, GM, HS, NS, and DS all made substantial contributions to the intellectual content and participated in drafting and revising the manuscript. They all read and approved the final manuscript and agree to be accountable to all aspects of the work.

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The impact of emotional intelligence on conditions of trust among leaders at the Kentucky Department for Public Health

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There has been limited leadership research on emotional intelligence and trust in governmental public health settings. The purpose of this study was to identify and seek to understand the relationship between trust and elements of emotional intelligence, including stress management, at the Kentucky Department for Public Health (KDPH). The KDPH serves as Kentucky's state governmental health department. KDPH is led by a Commissioner and composed of seven primary divisions and 25 branches within those divisions. The study was a non-randomized cross-sectional study utilizing electronic surveys that evaluated conditions of trust among staff members and emotional intelligence among supervisors. Pearson correlation coefficients and corresponding *p*-values are presented to provide the association between emotional intelligence scales and the conditions of trust. Significant positive correlations were observed between supervisors' stress management and the staff members' trust or perception of supervisors' loyalty ($r = 0.6$, $p = 0.01$), integrity ($r = 0.5$, $p = 0.03$), receptivity ($r = 0.6$, $p = 0.02$), promise fulfillment ($r = 0.6$, $p = 0.02$), and availability ($r = 0.5$, $p = 0.07$). This research lays the foundation for emotional intelligence and trust research and leadership training in other governmental public health settings, such as local, other state, national, or international organizations. This original research provides metrics to assess the public health workforce with attention to organizational management and leadership constructs. The survey tools could be used in other governmental public health settings in order to develop tailored training opportunities related to emotional intelligence and trust organizations.

Keywords: emotional intelligence, trust, leadership, public health workforce, stress management

INTRODUCTION

LEADERSHIP AND THE PUBLIC HEALTH WORKFORCE

The foundation of the public health infrastructure encompasses the information and knowledge systems, the public health workforce, and organizational capacity, which are required in order to accomplish core functions and essential public health services usually led by governmental public health organizations (1). The public health workforce has been described as the most important component of public health organizations and is the focus of 1 of the 10 essential public health services (2). Therefore, strengthening the public health workforce contributes to developing strong public health organizations and to improving the public health infrastructure (3). In order to determine how best to focus the limited resources available for improving the public health workforce, research that highlights and prioritizes the areas of greatest need within the workforce is important. According to the report, *The Future of the Public's Health in the Twenty-First Century*, leadership training, support, and development should be prioritized in public health organizations (4).

In order to succeed in a complex public health environment, practitioners are required to have skills related to self-actualization, optimism, stress tolerance, happiness, and assertiveness, all of which have been shown to be associated with positive performance outcomes in the work place (5). Emotional intelligence and trust may be factors that predict organizational performance in public health settings as well as competencies that can be identified within organizations, promoted through training, and studied through organizational practice-based research (6). To date, the published literature on leadership, emotional intelligence, and trust has largely focused on the business and private sectors and not the public or governmental sectors.

EMOTIONAL INTELLIGENCE

Emotional intelligence is defined in several ways, and includes the ability to understand, perceive, and use emotions to enhance thought and relationships (7). The underlying causes of emotions such as context, challenges, communication, and community must be understood and considered in order for emotional

intelligence competencies to be effectively exhibited (8). Emotional intelligence meets several standards of traditional intelligence: it can be seen as a specific mental ability that has "right" or "wrong" answers in its measure; it is correlated with other measures of intelligence, yet unique enough to be distinct; and it should develop with age (9).

Emotional intelligence is intuitively associated with leadership (10). One definition of effective leadership is, "the successful application of influence to the followers to achieve the leader's and the group's objectives" (11). Effective leadership is characterized, in part, by genuinely caring for people and enhancing positive feelings among followers (12, 13). Fambrough and Hart found that it is important that leaders consider the significance of emotions in their organizations (14). Leader-member relationships and emotional intelligence have also been studied. Emotional intelligence, authenticity, and relationship between the leader and the member may relate to leadership effectiveness (15).

Research conducted at the Center for Creative Leadership (CCL) evaluated leadership effectiveness utilizing "Benchmarks"®, a 360-degree leadership instrument that highlights skills related to leadership success. When leadership factors were compared with emotional intelligence factors among 236 leaders, 10 of the 16 leadership Benchmark factors were significantly related to the emotional intelligence factors (16). The more successful leaders had higher emotional intelligence subscale scores and of those subscales, 25% of the variance between successful and less-successful leaders could be attributed to: interpersonal relationships, stress tolerance, impulse control, and happiness (16). Unsuccessful leaders attributed their failure 11 percent of the time to technical incompetence and 23 percent of the time to lack of emotional intelligence (17). More specifically, low emotional intelligence is related to problems with interpersonal relationships, including difficulty changing or adapting that can negatively impact leaders, followers, peers, and others (18).

TRUST

Trust is a multi-faceted component, and the level of trust is related to the level of perceived risk. Greater trust is required when risk is higher. The characteristics of both the trustee and trustor are important for trust to exist (19). Leaders who act in a respectful and trusting manner, through honesty, fairness, and encouragement of teamwork, help to decrease stress and increase work performance (20). Trust has been shown to increase transparency, honesty, and openness related to information as well as admitting mistakes in order to create organizations that continue to remain viable (21).

Butler's research focused on 11 conditions of trust that lead to trust in an individual based on the Leader-Member Exchange theory (LMX). The LMX focuses on the dyad relationship between the leader and the follower, making this a useful theory for studying the relationship between supervisors and the members of their staff (22). This research, as well as this review of other trust literature, demonstrated that: (1) trust is an important part of relationships; (2) trust is especially important for managers; (3) trust in a specific person and/or situation was more predictive than a general trust in others; and (4) in order to understand trust, there are conditions leading to trust that can be measured (22).

Other studies strengthen the concept that there are conditions that lead to trust. Several adjectives used to describe trust included: ability, benevolence, competence, consistent behavior, empowerment, encouragement, ethical practices, honesty, integrity, loyalty, openness, promise fulfillment, and respect, which also relate to Butler's 11 conditions (19, 23–25).

EMOTIONAL INTELLIGENCE AND TRUST

Emotional intelligence fosters trust which is increased by emotional intelligence (26). An outcome of good leadership (which requires emotional intelligence) is trust (25). Preliminary research indicates that emotional intelligence and trust are related to each other, which has been demonstrated in educational settings, in corporate and manufacturing settings, and in one local public health setting (25, 27–30). This current research assesses the concepts of emotional intelligence and trust based on a supervisor/staff member dyad in a state-level governmental public health setting.

STUDY OBJECTIVE

The purpose of this study was to understand the relationship between aspects of emotional intelligence and conditions of trust between supervisors and the staff members who report to them in a public health setting.

MATERIALS AND METHODS

SETTING

The Kentucky Department for Public Health (KDPH) serves as the Commonwealth of Kentucky's state health department. KDPH is led by a commissioner and is composed of seven primary divisions led by division directors reporting to the commissioner. Within the seven divisions, there are 25 branches led by branch managers who report directly to the division directors. Within each branch there are between 1 and 14 staff members who report directly to the branch managers. This structure provides leadership for the work of the state health department.

PHASES

This study consisted of two phases: Phase I was a feasibility study conducted with the commissioner and division directors to determine the best methods to be utilized in Phase II. Phase II was the full study conducted with branch managers and the staff members who reported to them. During Phase I, the participants completed the survey instruments proposed for Phase II and were asked for feedback on the process and instruments. Specifically, they were asked to comment on the process as well as provide recommendations or concerns related to the survey instruments. The primary lessons learned from Phase I included the following: (1) participants needed more than 2 weeks to participate; (2) participants should not be required to answer every question in the survey; and (3) participants should only be required to answer the question that is necessary to link the data from two surveys together.

PARTICIPANTS

For Phase I, eight participants were eligible to participate; the seven division directors who reported to the commissioner and the commissioner. For Phase II, there were 24 active branch managers (one position was vacant) and there were a total of 149 staff members

reporting to the branch managers (31). Thus, a total of 173 KDPH employees were eligible to participate in the Phase II (full) study.

INSTRUMENTS

The study utilized two survey instruments that were administered electronically: the first measured emotional intelligence and the second measured conditions of trust. The two survey tools selected for this study were the Emotional Quotient Inventory (EQ-i®; Reuven Bar-On) (32) for supervisors and the Conditions of Trust Inventory (CTI; John Butler) (22) for staff.

There are several measures of emotional intelligence found in the literature. The emotional intelligence models either focus on abilities, competencies, or a mix that focuses on personal factors (7, 33, 34). Researchers who endorse ability-based models believe that mixed-model approaches do not provide valid assessments because of the emphasis on self-reporting rather than ability testing through general and expert consensus (7). However, the self-reporting tests tend to have higher face and predictive validity than the ability-based models (35). The primary emotional intelligence tests included: Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; ability-based), Emotional Competence Inventory Version 2, (ECI-2; self-reporting), EQ-i® (self-reporting), and the Emotional Intelligence Questionnaire (EIQ; self-reporting) (35).

The EQ-i® was selected following a review of several critiques of emotional intelligence instruments as well as through personal communication with individuals who utilized such instruments at the University of Kentucky in leadership settings. The EQ-i® focuses on a mix of personal factors and competencies. Permission was granted from Multi-Health Systems (MHS) to utilize the electronic version of the EQ-i®.

Trust relationships were evaluated in this study based on the LMX. The CTI was designed as a tool to increase understanding of the trust relationship between employees and managers. There are 11 supervisor behaviors considered in the CTI that facilitate trust including: (1) supervisor availability, (2) competence, (3) consistency, (4) discreetness, (5) fairness, (6) integrity, (7) loyalty, (8) openness, (9) promise fulfillment, (10) receptivity, and (11) overall trust (22). This survey instrument was selected to be administered to staff members since it provided a measure of trust and several components related to trust and because it had previously been utilized in research conducted within two local health departments; one in Northern Kentucky and the other in Cincinnati, OH, USA (36). The instrument developer provided a paper copy of the survey and written permission to use the survey in this research, including creating an electronic version of the survey.

SCORING

The EQ-i® was administered and scored through the MHS organizer web site, as a condition for utilizing the survey. The EQ-i® scoring resulted in mean scores based on the self-reported answers to survey questions providing an overall emotional intelligence score, 5 scales and 15 subscales for each respondent. The five scales include: (1) intrapersonal, (2) interpersonal, (3) stress management, (4) adaptability, (5) general mood. Each of the 15 subscales fit within the 5 scales and include: (1) self-regard, (2) emotional self-awareness, (3) assertiveness, (4) independence, (5) self-actualization, (6) empathy, (7) social responsibility, (8) interpersonal relationships, (9) stress tolerance, (10) impulse control, (11) reality testing, (12) flexibility, (13) problem solving, (14) optimism, and (15) happiness (32).

The possible range of mean scores was <70–130+. Each participant received a mean score for overall emotional intelligence, each of the 5 scales and the 15 subscales. According to the technical manual, a score of <70 indicated markedly low emotional competencies and skills; 70–79 indicated very low emotional competencies and skills; 80–89 indicated low or underdeveloped emotional competencies and skills; 90–109 indicated average or adequate emotional competencies and skills; 110–119 indicated high or well-developed emotional competencies and skills; 120–129 indicated very high or extremely well-developed emotional competencies and skills; and 130+ indicated markedly high emotional competencies and skills (32).

The CTI was based on a Likert scale including 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree (22). Each of the 11 conditions of trust subscales contained 1 negatively worded question to test for response pattern bias. These negatively stated inventory items were reverse coded during the data analysis stage. Reverse coding was performed based on previously conducted analysis by Mase (36).

VALIDATION

Both survey instruments have been previously validated. The EQ-i® was the first scientifically validated test developed to measure emotional intelligence behavior (16). The test was first developed in order to explain which characteristics relate to positive psychological well-being and it has now developed into a tool that assesses the combination of emotional intelligence and psychological well-being (32). Test questions focus on the frequency and intensity with which an individual uses emotional and social skills (16), resulting in face and predictive ability with strong conceptual and theoretical underpinnings (16, 32, 35). The CTI has content, construct, convergent, and discriminant validity and is based on the LMX theory (22).

DATA COLLECTION

This research project was approved by the University of Kentucky Institutional Review Board under IRB Protocol No. 09-0764-X1B on October 14, 2009. This research was also approved by the Kentucky Cabinet for Health and Family Services Institutional Review Board Protocol #CHFS-IRB-DPH-FY10-45 on February 25, 2010.

The supervisors did not have access to their staff members' trust scores, which protected the anonymity of staff members in order to encourage honesty in their assessment of their level of trust in their supervisor. This was especially important for some of the branches that only had two staff members, who could have been easily identified.

The study participants were recruited through face-to-face meetings where the research plan was presented and their participation requested. After these meetings, participants received electronic links to the surveys and follow-up reminders after 2 weeks to participate.

DATA MANAGEMENT

The University of Kentucky Research and Data Management Center (UKRDMC) was responsible for housing, de-identifying, and

linking the data. For Phase I, it received a copy of the commissioner's name and division directors and provided unique identifiers for the division directors. For Phase II, it received a copy of the names of the branch managers, their branches, and the staff members who reported directly to them providing each participant with a unique identifier. The electronic version of the EQ-i® required the participants to use their name in order to complete the survey.

An electronic version of the CTI was developed in cooperation with the UKRDMC. Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at the University of Kentucky (37). REDCap is a secure, web-based application designed to support data capture for research studies, providing: (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources. The CTI was administered to staff members directly reporting to the supervisors studied and required only the name of the branch in order for the survey to be completed. Each condition of trust score combined responses from four questions based on the analysis method of Mase (37). There were 10 staff members who did not have supervisors participate in the EQ-i® and were excluded. Of those who were included, if any one of the questions was not answered, that respondent did not have a total condition of trust score for the variable being examined and was only excluded from the analysis of that variable. The following number of people were excluded from each of the conditions of trust measures: overall trust = 3; availability = 0; competency = 3; consistency = 2; discreetness = 5; fairness = 3; integrity = 2; loyalty = 1; openness = 2; promise fulfillment = 1; and receptivity = 0.

The UKRDMC received the results of the EQ-i® as well as the CTI, linked the branch managers to the staff members who reported to them and de-identified the data. This data was then provided for analysis. Only the Phase II data was used in the analysis. Conditions of trust measures and staff characteristics were also provided in aggregate by supervisor. Conditions of trust measures and length of service aggregate measures were calculated using means; percentages were used for gender; and counts were used for total number of employees supervised.

STATISTICAL ANALYSIS

The primary measures of interest were 5 emotional intelligence scales for supervisors and their relationship with 11 conditions of trust aggregate scores. The five emotional intelligence scales were intrapersonal, interpersonal, adaptability, stress management, and general mood. The conditions of trust measures collected from staff included scores on overall trust, availability, competency, consistency, discreetness, fairness, integrity, loyalty, openness, promise fulfillment, and receptivity and each variable was averaged for each supervisor. These were summarized with descriptive statistics (n, median, first and third quartiles, and interquartile ranges), overall, and by supervisor gender. Other variables of interest included the gender of the supervisor, the number of staff per supervisor, female staff percentage as well as average staff service years in KDPH, current branch, and the field of public health. Continuous variables were summarized with descriptive statistics and categorical variables with counts and percentages. Pearson correlation coefficients and corresponding p-values are presented with scatterplots to provide the association between emotional intelligence scales and the conditions of trust.

RESULTS

The response rate for the full study was 79% (19/24) for supervisors (branch managers) and was 65% for (98/149) staff members who reported directly to the supervisors. In total, there were 16 supervisors who completed the EQ-i® and had staff members participate in the CTI. Eighty-eight staff members completed CTI who had supervisors complete the EQ-i®. Female supervisors accounted for 56.25% of participants (**Table 1**). Supervisors varied in the number of staff reporting to them (2–11) with a median of 6.2 average service years for staff in KDPH, 3.9 average years in current branches, and 9.7 average years in the field of public health. Minimal differences were observed when service years were stratified by supervisors' gender.

The median EQ scores were similar for male and female supervisors and remained in the average/adequate range for each major group (**Table 2**). However, male supervisors tended to have more variability in responses than female supervisors. When compared within each subgroup, the highest median score for male supervisors was stress tolerance and the lowest were self-actualization and empathy. The highest observed median score for female supervisors was empathy and the lowest was self-regard. Male supervisors had noticeably higher median scores than female supervisors in terms of self-regard, independence, and happiness, while female supervisors' median scores were observed to be higher with respect to empathy, self-actualization, and impulse control. The lowest observed median score for males was the highest median score for females (empathy).

Overall, the median aggregated condition of trust scores ranged from 3.8 (openness) to 4.5 (availability and competency; **Table 3**).

Table 1 | Demographics by supervisor.

	All	Female	Male
Supervisor (%)	16	9 (56.25%)	7 (43.75%)
Number of staff by supervisor	5 (2, 11)	5 (2, 11)	5 (2, 10)
Female staff average proportion	0.9 (0.4, 1.0)	0.9 (0.4, 1.0)	0.9 (0.6, 1.0)
Staff service average years			
KDPH[a]	6.2 (2.8, 9.6)	6.1 (2.8, 9.6)	6.2 (3.4, 9.6)
Branch[b]	3.9 (1.7, 9.2)	4.2 (1.2, 7.6)	3.4 (2.2, 9.2)
Public health[c]	9.7 (1.2, 16.8)	10.0 (1.2, 15.0)	9.4 (5.8, 16.8)

Summaries are presented as n (%) or median (min, max).

The average number of years of service for staff was calculated by supervisors and summarized for

[a] *KDPH,*

[b] *Branch, and*

[c] *Public health.*

Table 2 | Emotional intelligence scores for supervisors.

EQ scores (*n*)	All (16)	Male [7 (43.75%)]	Female [9 (56.25%)]
Total EQ	111 (104, 117)	111 (100, 118)	108 (107, 116)
Intrapersonal	109 (104, 117)	109 (95, 126)	108 (107, 116)
Self-regard	107 (97, 113)	110 (95, 113)	100 (99, 112)
Emotional self-awareness	111 (105, 118)	108 (92, 116)	114 (106, 118)
Assertiveness	113 (108, 118)	116 (108, 127)	111 (108, 117)
Independence	107 (100, 115)	114 (95, 123)	106 (104, 113)
Self-actualization	106 (100, 110)	101 (95, 118)	107 (105, 110)
Interpersonal	107 (98, 113)	108 (94, 113)	106 (102, 112)
Empathy	103 (92, 117)	101 (85, 105)	116 (100, 118)
Social responsibility	108 (103, 112)	108 (100, 110)	109 (104, 112)
Interpersonal relationship	103 (99, 110)	103 (96, 117)	103 (99, 110)
Adaptability	110 (103, 114)	108 (101, 113)	111 (105, 118)
Reality testing	112 (106, 116)	107 (104, 112)	113 (112, 118)
Flexibility	109 (100, 116)	106 (94, 115)	110 (104, 116)
Problem solving	105 (99, 109)	105 (105, 114)	105 (95, 108)
Stress management	113 (108, 116)	112 (104, 116)	114 (108, 116)
Stress tolerance	115 (108, 118)	118 (108, 118)	114 (108, 116)
Impulse control	109 (101, 115)	103 (100, 117)	110 (106, 113)
General mood	106 (101, 112)	105 (99, 114)	106 (102, 110)
Happiness	106 (101, 113)	112 (97, 114)	104 (102, 109)
Optimism	107 (99, 111)	104 (96, 110)	107 (104, 111)

Table 3 | Aggregated staff conditions of trust scores for supervisors by gender.

Condition	All	Male	Female
Overall trust	4.0 (3.3, 5.0)	4.0 (3.4, 5.0)	4.0 (2.8, 5.0)
Availability	4.5 (3.8, 5.0)	4.3 (4.0, 5.0)	4.5 (3.8, 5.0)
Competency	4.5 (3.5, 5.0)	4.3 (3.8, 5.0)	4.7 (3.3, 5.0)
Consistency	4.0 (3.0, 4.5)	4.0 (3.3, 4.5)	4.0 (3.0, 4.5)
Discreetness	4.0 (3.0, 5.0)	3.8 (3.0, 4.8)	4.4 (3.0, 5.0)
Fairness	4.0 (3.5, 5.0)	3.8 (3.5, 5.0)	4.8 (3.3, 5.0)
Integrity	4.3 (3.3, 5.0)	4.0 (3.3, 5.0)	4.5 (2.8, 5.0)
Loyalty	4.0 (3.0, 5.0)	3.8 (3.0, 4.8)	4.3 (2.5, 5.0)
Openness	3.8 (3.0, 4.3)	3.8 (3.1, 4.0)	4.0 (3.0, 4.5)
Promise fulfillment	4.0 (3.0, 5.0)	4.0 (3.0, 4.8)	4.0 (3.0, 5.0)
Receptivity	4.1 (3.5, 5.0)	4.5 (3.5, 5.0)	4.0 (3.3, 5.0)

Staff scores were averaged for a supervisor and these averaged values are summarized here for supervisors (n = 16) as median (Q1, Q3).

For male supervisors, the highest observed median condition of trust score ($M = 4.5$) was receptivity and the lowest ($M = 3.8$) were discreetness, fairness, loyalty, and openness. Among female supervisors, the highest median condition of trust score ($M = 4.8$) was fairness, which was one of the lowest observed scores for male supervisors. In general, female supervisors tended to have higher observed median aggregate condition of trust scores than male supervisors in all domains except receptivity.

Significant positive correlations were observed between supervisors' stress management (EQ-i) and the aggregate measures of trust, loyalty ($r = 0.6$, $p = 0.01$), integrity ($r = 0.5$, $p = 0.03$), receptivity ($r = 0.6$, $p = 0.02$), promise fulfillment ($r = 0.6$, $p = 0.02$), and availability ($r = 0.5$, $p = 0.07$). This analysis was further performed using the specific EQ-i stress subscales: impulse control and stress tolerance (**Figure 1**). There was no significant correlation between stress tolerance and any of the aggregated staff conditions of trust. However, significant positive correlation was found between impulse control and loyalty ($r = 0.6$, $p = 0.01$), integrity ($r = 0.6$, $p = 0.02$), receptivity ($r = 0.6$, $p = 0.01$), promise fulfillment ($r = 0.6$, $p = 0.02$), and availability ($r = 0.6$, $p = 0.02$).

DISCUSSION

In order to assure a competent public health workforce, continuing to identify and prioritize areas related to public health leadership and training is crucial. The Public Health Workforce Research Agenda includes two areas that are particularly applicable to this research: (1) how is workforce competency measured at an individual level or for a specific role such as leadership? and (2) to achieve a significant impact, are certain individual competencies of greater importance than others? (38).

The finding that supervisors have average or high levels of emotional intelligence is important data for the KDPH. Since the supervisors have a higher than average emotional capacity to deal with stress and since stress management has an impact on conditions of trust, there are implications for recruitment and retention in leadership positions for public health.

Recruitment and retention are priorities identified by the Centers for Disease Control and Prevention Office of Workforce and Career Development (39). Perhaps the participating supervisors developed the ability to effectively manage stress prior to assuming a leadership position or they may have developed this ability while working within a stressful environment. Turnover rates may be higher among public health managers who do not have a high capacity to manage stress which may have an impact on the staff member's ability to trust the supervisor, potentially leading to staff member turnover. In this study, information was not collected from the supervisors related to their length of service in public health, in their current branch, or in KDPH. Future workforce-related research should investigate the relationship between stress management, length of service, and propensity toward retention or turnover. In addition, research could focus on the public health organization as the unit of analysis, providing important environment and contextual information.

Other settings tend to have emotional intelligence rates that are similar to the ones found at KDPH. A group known as the Young President's organization, which includes individuals who have become top leaders and earned a minimum of $5 million dollars by the age of 39, had stress tolerance, with a mean of 109, among their highest scores (32). An assessment within the financial services industry found above average emotional intelligence scores, with a stress tolerance score of 105 (32). The mean scores of stress tolerance at KDPH were even higher at a mean of 111, demonstrating capacity for strong leadership and stress tolerance even beyond these private industries.

There are implications for training and continuing education related to leadership, emotional intelligence, and trust in KDPH. Even though stress management ranks consistently high among

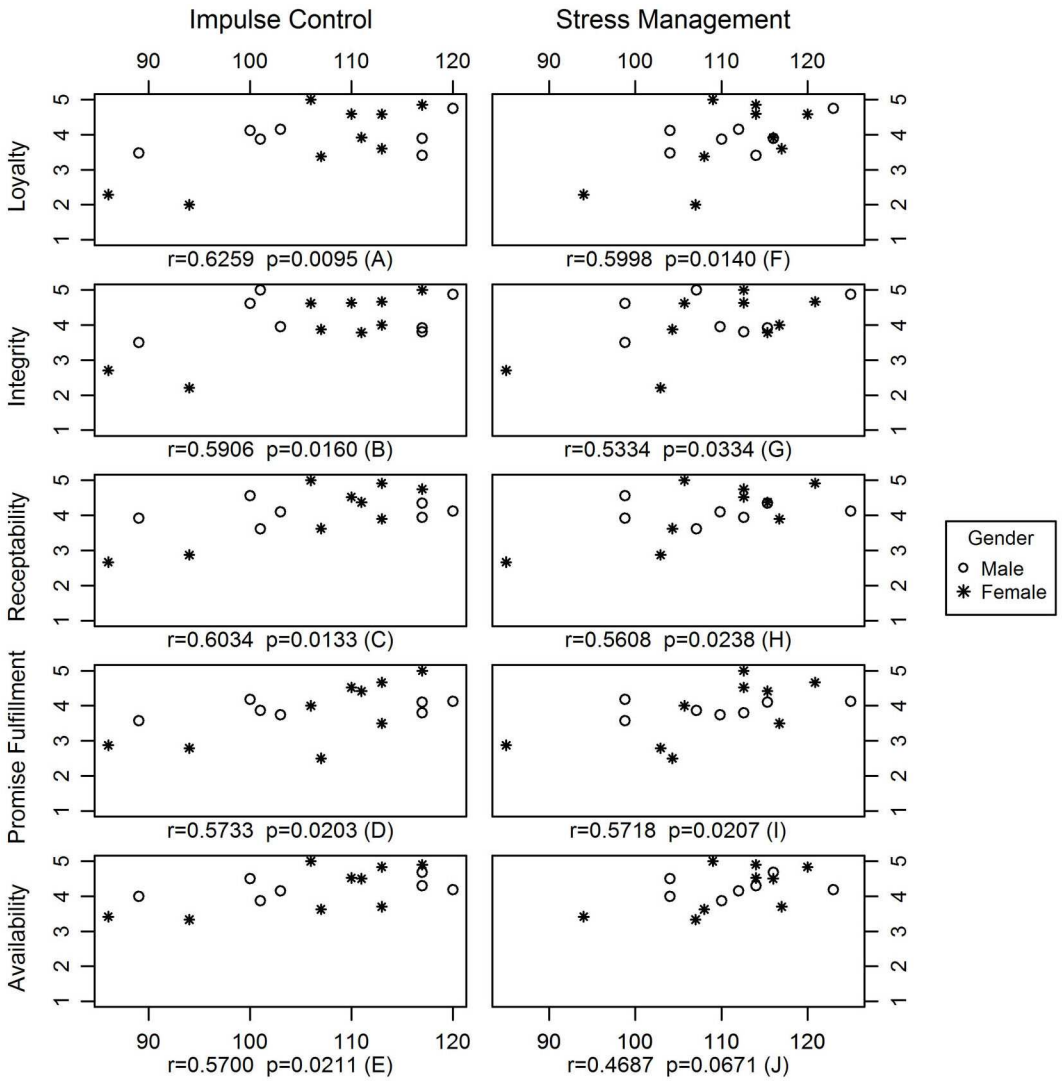

FIGURE 1 | Correlation between stress management and conditions of trust and between impulse control and conditions of trust.

supervisors, since there is a strong relationship between stress management and several conditions of trust, ongoing training and professional development related to stress management should be conducted to enhance an environment of trust and enhance recruitment and retention within public health settings.

Public health leaders should also consider targeted training approaches to continuing education opportunities. As a benefit for supervisors to participate in this study, the principal investigator partnered with a certified EQ-i® administrator from the Kentucky Public Health Leadership Institute who downloaded individual resource reports and provided personal results feedback to interested participants as an opportunity for professional development and coaching. The study findings indicate the need to consider tailoring training opportunities to areas of greatest improvement for certain demographic groups in the public health workforce, which could involve focusing on employees by gender, race, or seniority. Training opportunities could be piloted in certain branches or divisions rather than Department-wide.

Certain limitations should be considered related to this study. The research design was a non-randomized cross-sectional study; therefore results may not be generalizable outside the study population. However, since all the state health department branch managers and the staff members who reported directly to them were invited to participate, the results may be generalized to other state governmental public health settings with similar structures. There was a small sample size (16 supervisors) and there were average and high emotional intelligence scores. The only correlation between emotional intelligence and any conditions of trust was in stress management as well as one of the subscales of stress management, impulse control. The study was based on self-reported data using electronic survey tools, which could introduce recall and perception bias. Another limiting factor relates to participation. There

may be differences between those who participated and those who did not participate. Also, the study does not include the organizational context or past examples of relationships and triggers that may have an impact on the results (40).

This research lays the foundation for emotional intelligence and trust to be assessed further in public health settings. The principal investigator shared the results of the study with the KDPH through small group meetings with the commissioner and with supervisors and staff members. The KDPH employees demonstrated an interest in further studies examining these relationships in other leaders. For instance, this study measured the relationship between branch managers and the staff members who report to them, but it did not look at the relationship between the branch manager and the division director. Several staff asked if it would be possible to examine these other relationships in future research. Utilizing the KDPH leadership staff and implementing two validated surveys provides a methodology that can be replicated within the KDPH as well as with other public health settings.

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Full-range public health leadership, part 1: quantitative analysis

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Background: Workforce and leadership development are central to the future of public health. However, public health has been slow to translate and apply leadership models from other professions and to incorporate local perspectives in understanding public health leadership.

Purpose: This study utilized the full-range leadership model in order to examine public health leadership. Specifically, it sought to measure leadership styles among local health department directors and to understand the context of leadership in local health departments.

Methods: Leadership styles among local health department directors ($n = 13$) were examined using survey methodology. Quantitative analysis methods included descriptive statistics, boxplots, and Pearson bivariate correlations using SPSS v18.0.

Findings: Self-reported leadership styles were highly correlated to leadership outcomes at the organizational level. However, they were not related to county health rankings. Results suggest the preeminence of leader behaviors and providing individual consideration to staff as compared to idealized attributes of leaders, intellectual stimulation, or inspirational motivation.

Implications: Holistic leadership assessment instruments such as the multifactor leadership questionnaire can be useful in assessing public health leaders' approaches and outcomes. Comprehensive, 360-degree reviews may be especially helpful. Further research is needed to examine the effectiveness of public health leadership development models, as well as the extent that public health leadership impacts public health outcomes.

Keywords: public health leadership, multifactor leadership questionnaire, public health workforce development, transformational leadership, local health department, full-range leadership

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Full-Range Public Health Leadership

Today's public health leaders face increasingly complex challenges while being called on more and more to collaborate with and lead in the communities in which they live, work, and serve. Health care reform is transforming the entire health system, including public health. Public health agencies, tasked with basic care for the indigent and assurance of health standards for whole populations, have their budget appropriations cut so that they not only have reduced physical and medical resources, but also have fewer human resources to assign to meet those needs (1, 2). Those human resources – the public health workforce – are in the midst of significant upheaval. The retirement of

large numbers of highly experienced members of the public health workforce results in a dearth of practical knowledge as new staff members, when they can be hired, may not have similar educational or experiential backgrounds (3). Concern for what national health reform will mean for the public health organization and its employees is an issue (4, 5). Committed and effective leadership in public health has perhaps never been more important (6). The vital issues of today demand public health leaders who are as skilled and astute politically as they are at managing the technical and systemic aspects of public health (7, 8). Given this highly dynamic context, understanding and developing the leadership abilities of public health leaders is essential to meeting the demands of population health issues.

In *The Future of Public Health* (9), the Institute of Medicine (IOM) suggested that without appropriate attention to workforce and leadership development, public health organizations would be ill prepared to fulfill the essential purposes of public health. By 2003, the IOM had published two additional reports, *The Future of the Public's Health in the 21st Century* (10) and *Who Will Keep the Public Healthy?* (11). Both of these studies reiterated the workforce and leadership development themes identified 15 years previously: leadership training and development activities must be a priority for both governmental public health organizations and academic public health institutions.

Public Health Leadership Development Efforts

Since the initial IOM report, public health practice and academic organizations have focused increasingly on public health leadership development. These efforts include the development of state, regional, national, and international public health leadership institutes, the formation of a national public health leadership development network, and the development of public health leadership competency frameworks for both educational and practice settings. These efforts shape the development of public health leaders now and into the future.

To assist in the shaping of future public health leaders, the Association of Schools and Programs of Public Health (ASPPH) has developed core competencies for individuals obtaining Master of Public Health (MPH) (12) or Doctor of Public Health (DrPH) (13) degrees. Both models delineate specific competencies necessary for public health students to evince in order to achieve their leadership potential. Further, both models define leadership in terms of creating a shared vision, combined with notions of motivating others, galvanizing organizational and community resources to address public health problems, and utilizing the best strategies and practices to enhance service and solve problems. Finally, both models highlight the potential of public health graduates to lead organizations and communities, with the competence to influence others, establish a shared vision, and accomplish the mission of public health. Further, leadership competencies are not the purview of ASPPH alone. The Core Competencies for Public Health Professionals (14) include leadership and systems thinking skills. Clearly, leadership competence is on the agenda for current and future public health workforce efforts.

The overarching theme of public health leadership literature and public health leadership development efforts is the need for highly skilled and well-educated leaders capable of galvanizing organizations and communities in transformational change processes that not only ensure, but also seek to improve the health and well-being of the public. These efforts frame a vision for public health leadership that currently prefers transformational, change-agent leaders. However, as Nicola (15) has pointed out, classic management functions – planning, organizing, leading, and controlling – remain vital to assuring the performance of public health organizations. While transformational leadership qualities enable public health leaders to engage communities in efforts to improve population health, the full range of leadership qualities, including technical and managerial acumen, is necessary not only to lead change but also to effectively attend to general and regular organizational tasks and responsibilities should not be overlooked.

To that end, leadership may have discipline-specific requirements unique to public health. Rather than assume that leadership qualities, characteristics, and processes are universal to all professions, public health agencies would benefit from a better understanding of the skills and competencies required for successful public health leadership.

Purpose

The purpose of this study was to examine the full range of leadership styles among local health department directors in Kentucky. Specifically, this portion of the study quantitatively explores: (1) the leadership styles of local health department directors and their perceptions of organizational outcomes, (2) the sub-components of each style contributing to the overall leadership style of local health department directors, and (3) whether there is any relationship between leadership styles and specific county health outcomes. We posited that while leadership styles would vary, the predominant leadership style, and the one most closely correlated with positive leadership outcomes, would be the transformational leadership style.

Method

This study used the multifactoral leadership questionnaire (MLQ), developed by Avolio and Bass (16). The 45-item MLQ is among the most commonly used and validated measures of full-range leadership styles (16–23), and has been shown to be an effective tool in leadership development (24, 25). The MLQ measures three general leadership styles – transformational, transactional, and passive-avoidant – and nine sub-types (see **Table 1**), as well as outcomes of leadership. Each of the individual leadership components in the MLQ, including the leadership outcomes, yields a raw score between 0 and 4. These scores are translated into percentiles based on national norms for self-reported data provided with the MLQ instrument. Licenses to use the MLQ were purchased. The MLQ was combined with demographic variables and distributed electronically to local public health directors using Qualtrics.

Using a consensus-driven sampling approach, this study identified local health directors as potential subjects by interviewing key state and university public health leaders. Specifically, one paragraph, literature-based (i.e., theory-driven) descriptions of transformational and transactional leadership styles were given to an expert group of individuals well-acquainted with potential study participants. These individuals were independently asked to

TABLE 1 | Brief definitions of leadership types and sub-types and outcomes of leadership.

Leadership type	Definition/characteristics
Transformational leadership	Transformational leaders influence and change followers' awareness of what is important, providing a greater vision of themselves and the opportunities and challenges of their environment. They are proactive and strive to optimize individual, group, and organizational development, and innovation. They influence associates, coworkers, and followers to strive for higher levels of performance and higher moral and ethical standards
Idealized influence attributes (IIA)	Idealized attributes include: instilling pride in others, going beyond self-interest for the good of the group, acting in ways that build others' respect, and displaying a sense of power and confidence
Idealized influence behaviors (IIB)	Idealized behaviors include: talking about important values and beliefs, specifying the importance of having a strong sense of purpose, considering the moral and ethical consequences of decisions, and emphasizing the importance of having a collective sense of mission
Inspirational motivation (IM)	These leaders behave in ways that motivate others by providing meaning and challenge to their followers' work. Enthusiasm and optimism arouse individual/team spirit. They articulate a compelling vision of the future and expressing confidence that goals will be achieved
Intellectual stimulation (IS)	These leaders stimulate their followers' efforts to be innovative and creative by questioning assumptions, reframing problems, and approaching old situations in new ways. They re-examine critical assumptions, seek differing perspectives when solving problems, get others to look at problems from many different angles, and suggest new ways of looking at how to complete assignments
Individual consideration (IC)	These leaders pay attention to each individual's need for achievement and growth. Individual differences in terms of needs and desires are recognized. These leaders spend time teaching and coaching and help others to develop their strengths
Transactional leadership	Transactional leaders focus on constructive (contingent reward) and corrective (management-by-exception) transactions, by defining expectations and promoting performance to achieve these levels. These leadership styles are among the core "management" functions in organizations
Contingent reward (CR)	These leaders clarify expectations and offer recognition when goals are achieved. These leaders provide others with assistance in exchange for their efforts, discuss in specific terms responsibility for achieving performance targets, make clear what one can expect to receive when performance goals are achieved
Management-by-exception: active (MBEA)	This style of leadership implies closely monitoring for deviances, mistakes, and errors and then taking corrective action as quickly as possible when they occur. These leaders focus attention on irregularities, mistakes, exceptions, and deviations from standards
Passive-avoidant leadership	Passive leaders do not specify agreements, clarify expectations, or provide goals and standards to be achieved by followers. It is a style typified as being more passive and reactive
Management-by-exception: passive (MBEP)	Passive leaders fail to interfere until problems become serious, waiting for things to go wrong before taking action. They show a firm belief in "if it ain't broke, don't fix it"
Laissez-Faire (LF)	Laissez-faire leaders avoid getting involved when important issues arise, are often absent when needed, avoid making decisions, and delay responding to urgent questions

identify approximately five to seven effective local health department directors who possessed qualities of either transformational leadership or transactional leadership. Passive-avoidant leadership is also referred to as "non-leadership" in the full-range leadership literature. For this reason, we sought to sample only leaders thought to possess one of the two primary leadership styles – transformational and transactional. A group of 15 transformational directors and 15 transactional directors were identified from which a sample of 10 directors from each leadership style category was randomly selected. This random selection served to reduce sampling bias. Some of the health department directors declined participation in the study. While completion of the survey was voluntary, initial non-response initiated two additional attempts to solicit participation in order to maximize the response rate. All surveys were administered electronically using Qualtrics, with links to the survey provided by email to the participants. Finally, as an incentive to participate, individual directors who elected to complete the survey received direct feedback in the form of a report that interpreted the results of survey, identifying leadership strengths, and suggesting potential growth areas.

A final sample of 20 directors was identified and they were invited to participate in the quantitative phase of the study. The sample consisted of 10 directors perceived to be more transformational and 10 directors perceived to be more transactional. To encourage participation, the survey email was preceded by an email from the state commissioner for public health. The survey email was followed by up to two additional contacts inviting participants to complete the survey. Thirteen directors completed the survey for a 65% response rate. This included seven directors from the perceived transformational group and six from the perceived transactional group.

Leadership Outcomes

Transformational and transactional leadership are both related to the success of the group. Success, or outcomes of leadership, was measured with the MLQ through leaders' self-reported skills at motivation, effectiveness in interacting at different levels of the organization, and perceived employee satisfaction with leaders' methods of working with others. These include: extra effort (EE), effectiveness (EFF), and satisfaction with the leadership (SAT). EE may be defined as the extent to which leaders get others to do more than they expected to do, heighten others' desire to succeed, and increase others' willingness to try harder. Effective leaders are effective in meeting others' job-related needs, in representing their group to higher authority, and in meeting organizational requirements. They lead groups that are effective. Leadership satisfaction

includes: using methods of leadership that are satisfying and working with others in a satisfactory way.

Analysis

The extent of transformational and transactional leadership styles and components of leadership styles reported by study participants was explored with descriptive statistics (e.g., means and SDs). Pearson bivariate correlation coefficients were calculated to measure relationships between variables of interest. Given the limited sample size, power analyses, as well as additional or more complex analyses, were not feasible. Finally, findings from the descriptive analysis were examined for any relationship to existing county-level data: Beale Codes, which measure relative population density on a rural-urban continuum, and the County Health Rankings (26), which rank counties based on health outcomes (mortality and morbidity) and health factors (health behaviors, clinical care, physical environment, and social and economic factors).

This study was approved by the University of Kentucky Institutional Review Board.

Results

Participant Demographics

Thirteen local health directors completed the initial survey phase of the study. Complete demographics are provided in **Table 2** below. Nearly two-thirds (62%) of participants were female and the majority ($n = 12$, 92%) were white. Participants were of varying ages. All participants had at least a bachelor's degree. The majority ($n = 11$, 85%) classified their health departments as rural and the others ($n = 2$, 15%) classified their health departments as sub-urban.

Personal leadership development was at least a moderate priority for participants. About a third of participants ($n = 4$, 31%) indicated that their own leadership development was a moderate priority. Just over two-thirds ($n = 9$, 69%) felt it was a high priority. Similarly, developing the leadership abilities of staff was also at least a moderate priority for participants. The results were identical. About a third of participants ($n = 4$, 31%) indicated that their own leadership development was a moderate priority. Just over two-thirds ($n = 9$, 69%) felt it was a high priority. Finally, participants felt their leadership at least had considerable influence on the performance of the organization. Just over two-thirds of participants ($n = 9$, 69%) believed their leadership had considerable influence on the performance of the organization; while about a third ($n = 4$, 31%) indicated that their own leadership had significant influence on organizational performance.

TABLE 2 | Demographics ($n = 13$).

Background information	Participants ($n = 13$)
Gender	
Male	5 (38%)
Female	8 (62%)
Race	
White/Caucasian	12 (92%)
Black	1 (8%)
Other	0 (0%)
Age	
18–25	0 (0%)
26–35	1 (8%)
36–45	2 (15%)
46–55	7 (54%)
55 +	3 (23%)
Highest education completed	
High school/Associate's degree	0 (0%)
Bachelor's degree	2 (15%)
Master's degree	10 (77%)
Doctoral degree	1 (8%)
Public health degree (MPH, DrPH)	
Yes	4 (31%)
No	9 (69%)
Graduate of a ph leadership institute	
Yes	9 (69%)
No	4 (31%)
Type of health department	
Urban	0 (0%)
Sub-urban	2 (15%)
Rural	11 (85%)

TABLE 3 | Leadership styles and sub-styles.

Transformational	Transactional	Passive-avoidant
1. Idealized attributes	1. Contingent reward	1. Management by exception – passive
2. Idealized behaviors	2. Management by exception – active	2. Laissez-Faire
3. Inspirational motivation		
4. Intellectual stimulation		
5. Individual consideration		

Self-Reported Leadership Styles

Table 3 provides a reference to the reader on the major leadership styles and their sub-style components.

Participants self-reported a wide range of leadership styles, with wide variance across all leadership characteristics.

Transformational Leadership

Among characteristics of transformational leadership, idealized attributes had a mean percentile of 53.15 (SD = 33.63), with a minimum percentile of 1 and a maximum percentile of 90. Idealized behaviors had a mean percentile of 74.23 (SD = 20.50), with a minimum percentile of 30 and a maximum of 95. Inspirational motivation had a mean percentile of 55.00 (SD = 29.51), with a minimum percentile of 20 and a maximum of 95. Intellectual stimulation had a mean percentile of 66.92 (SD = 19.21), with a minimum percentile of 40 and a maximum of 95. Finally, individual consideration had a mean percentile of 64.23 (SD = 27.37), with a minimum percentile of 10 and a maximum of 95.

Transactional Leadership

Among characteristics of transactional leadership, contingent reward had a mean percentile of 61.92 (SD = 25.21), with a minimum percentile of 30 and a maximum percentile of 95. Management by exception – active had a mean percentile of 38.15 (SD = 31.88), with a minimum percentile of 5 and a maximum of 80.

Passive-Avoidant Leadership

Among characteristics of passive-avoidant leadership, management by exception – passive had a mean percentile of 38.15 (SD = 26.93), with a minimum percentile of 1 and a maximum percentile of 95. Laissez-Faire had a mean percentile of 30.54 (SD = 36.44), with a minimum percentile of 1 and a maximum of 95.

Self-Reported Leadership Outcomes

Consistent with the range of self-reported leadership styles, participants also reported variance in leadership outcomes, especially for EFF. EE had a mean percentile of 62.7 (SD = 18.34), with a minimum percentile of 26 and a maximum percentile of 88. EFF had a mean percentile of 48.9 (SD = 20.73), with a minimum percentile of 20 and a maximum of 88. Finally, satisfaction had a mean percentile of 34.4 (SD = 29.30), with a minimum percentile of 1 and a maximum of 95. Finally, overall work outcome had a mean percentile of 34.4 (SD = 29.30), with a minimum percentile of 1 and a maximum of 95.

Bivariate Correlations for Self-Reported Leadership Styles and Outcomes of Leadership

Transformational Leadership

When individual components of transformational leadership were examined, strong and significant correlations were found among most components and overall transformational (OTF) leadership, except for intellectual stimulation. As shown in **Table 4**, intellectual stimulation was not significantly correlated to any of the other individual components of transformational leadership or OTF leadership. Further, idealized attributes were only strongly and significantly correlated with idealized behaviors (Pearson $r = 0.621$, $p < 0.05$) and OTF leadership (Pearson $r = 0.641$, $p < 0.05$), and not the other components. Idealized behaviors were strongly and significantly correlated with inspirational motivation (Pearson $r = 0.782$, $p < 0.01$) and individual consideration (Pearson $r = 0.652$, $p < 0.05$), as well as OTF leadership (Pearson $r = 0.914$, $p < 0.001$). Among attributes of transformational leadership, idealized behaviors (Pearson $r = 0.914$, $p < 0.001$) and inspirational motivation (Pearson $r = 0.834$, $p < 0.001$) were most strongly and most significantly correlated with OTF leadership.

Transactional Leadership

As shown in **Table 5**, among attributes of transactional leadership, both contingent reward (Pearson $r = 0.640$, $p < 0.05$) and management by exception – active (Pearson $r = 0.794$, $p < 0.01$) were strongly and significantly correlated with overall transactional (OTA) leadership. However, no correlation was found between the individual components.

Passive-Avoidant Leadership

Strong and significant correlations were found among components of passive-avoidant leadership. Specifically, both management by exception – passive (Pearson $r = 0.897$, $p < 0.001$) and Laissez-Faire (Pearson $r = 0.945$, $p < 0.001$) were strongly and significantly correlated with overall passive-avoidant (OPA) leadership. Additionally, a strong and significant correlation (Pearson $r = 0.704$, $p < 0.01$) was also found between the two individual sub-scale components (see **Table 6**).

TABLE 4 | Pearson correlation coefficients for components of transformational leadership ($n = 13$).

	IA	IB	IM	IS	IC	OTF
Idealized attributes (IA)	–	**0.621***	0.472	−0.249	0.120	**0.641***
Idealized behaviors (IB)		–	**0.782****	0.078	**0.652***	**0.914*****
Inspirational motivation (IM)			–	0.129	0.459	**0.834*****
Intellectual stimulation (IS)				–	0.518	0.332
Individual consideration (IC)					–	**0.745****
Overall transformational (OTF)						–

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

TABLE 5 | Pearson correlation coefficients for components of transactional leadership ($n = 13$).

	CR	MBEA	OTA
Contingent reward (CR)	–	0.042	**0.640***
Management by exception – active (MBEA)		–	**0.794****
Overall transactional (OTA)			–

*$p < 0.05$. **$p < 0.01$.

TABLE 6 | Pearson correlation coefficients for components of passive-avoidant leadership ($n = 13$).

	MBEP	LF	OPA
Management by exception – passive (MBEP)	–	**0.704****	**0.897*****
Laissez-Faire (LF)		–	**0.945*****
Overall passive-avoidant (OPA)			–

**$p < 0.01$. ***$p < 0.001$.

Overall Leadership Styles and Outcomes of Leadership

As shown in **Table 7**, no correlations existed between overall leadership styles. However, strong and significant correlations were found among OTF leadership styles and outcomes of leadership, including overall outcomes of leadership. Specifically, OTF leadership was strongly and significantly correlated to EE (Pearson $r = 0.818$, $p < 0.01$), EFF (Pearson $r = 0.759$, $p < 0.01$), and satisfaction (Pearson $r = 0.845$, $p < 0.001$), as well as overall leadership outcomes (Pearson $r = 0.846$, $p < 0.001$). Further, as shown below, strong and significant correlations were also found among all individual components of leadership outcomes, as well as overall leadership outcomes.

Bivariate Correlations for Self-Reported Leadership Styles and County Health Outcomes

As shown in **Table 8**, neither participants' leadership styles nor individual leadership style components were correlated with County Health Rankings (health outcomes and health factors). However, significant moderate correlations were found between county Beale code classification and both health outcomes (Pearson $r = 0.401$, $p < 0.01$) and health factors (Pearson $r = 0.313$, $p < 0.05$). Further, health outcomes were strongly and significantly correlated with health factors (Pearson $r = 0.683$, $p < 0.01$). Finally, when calculated across the counties they serve, a strong, significant, and negative correlation (Pearson $r = .-0.608$, $p < 0.001$) was found between participants' OTF leadership and overall passive-avoidant leadership styles.

TABLE 7 | Pearson correlation coefficients for overall leadership styles and leadership outcomes ($n = 13$).

	OTF	OTA	OPA	EE	EFF	SAT	LO
Overall transformational (OTF)	–	−0.010	−0.328	**0.818****	**0.759****	**0.845*****	**0.846*****
Overall transactional (OTA)		–	−0.003	−0.003	0.101	0.252	0.123
Overall passive-avoidant (OPA)			–	−0.265	−0.166	−0.341	−0.265
Extra effort (EE)				–	**0.839*****	**0.867*****	**0.944*****
Effectiveness (EFF)					–	**0.859*****	**0.954*****
Satisfaction (SAT)						–	**0.953*****
L'ship outcomes (LO)							–

$^{**}p < 0.01$. $^{***}p < 0.001$.

TABLE 8 | Pearson correlation coefficients for leadership styles, county location, and county health rankings ($n = 45$).

	OTF	OTA	OPA	BC	HO	HF
Overall transformational (OTF)	–	−0.099	**−0.608*****	−0.195	−0.160	0.150
Overall transactional (OTA)		–	−0.019	−0.174	0.112	−0.022
Overall passive-avoidant (OPA)			–	0.287	0.220	−0.086
Beale code (BC)				–	**0.401****	**0.313***
Health outcomes (HO)					–	**0.683****
Health factors (HF)						–

$^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

Discussion, Implications, and Limitations

The results indicate that among the sample studied, leadership outcomes were a function of transformational rather than transactional leadership. The high degree of significant correlation between transformational leadership and self-reported outcome constructs such as EE, EFF, and satisfaction suggests a perception among public health leaders that such transformational qualities can lead to desirable performance outcomes, including better operated health departments, and harder working, more satisfied employees.

As a consequence, an examination of the individual transformational leadership sub-scales is compelling. Among the leaders sampled, transformational leadership was not a function of intellectual stimulation and was only mildly, if significantly, correlated with idealized leader attributes. Rather, the idealized behavior, inspirational motivation, and individual consideration components of the transformational leader stand out. It is possible that those surveyed viewed these aspects of leadership more positively, or perceived that they are leadership skills in which these leaders feel strong or confident and so are qualities more fully relied upon. Certainly, most leaders will not possess all subcomponents of a given leadership style; however, a defined group is leaders commonly identified a discrete set of leadership qualities is intriguing and likely merits further examination.

Leadership outcomes that were not correlated with passive-avoidant leadership (also known as non-leadership) were expected and it is not surprising that leadership styles were not associated with country health rankings. Perhaps, if all local health department executives in a state were surveyed and their leadership style(s) compared to the relative health ranking of the county(ies) for which they are responsible, some correlation maybe found; however, that is not likely. These rankings are broad measures of health within communities and are largely a function of factors much broader than the individual at the helm of a local health department, whose tenure in that position is likely not nearly as long as the time required to either directly cause or remedy the noted rankings and the health outcomes on which they are based.

Implications for Practice

While fuller implications of both quantitative and qualitative phases of this study will be discussed in the adjoining companion paper, this quantitative portion of the study has important implications for public health practitioners. The first of these is the potential for public health leaders, including local health department directors and local boards of health, as well as public health educators, to adopt well-grounded and more holistic instrumentation such as the MLQ in their assessment of leadership styles and abilities. Such tools provide and, if used generatively, help develop greater self-awareness related to leadership styles and behaviors. Many leadership style and personality instruments have been developed, including but certainly not limited to the MLQ instrument used in this study. These instruments are available to measure a range of skills from basic management to levels of emotional intelligence. Developing a detailed leadership assessment for public health practitioners may be useful if based on empirically validated instruments, including a self-generating interpretive report which could be made readily available to interested health departments or individuals. These tools may be especially useful when orienting new supervisors or as a part of accredited higher education programs.

Assessments such as the MLQ may be helpful to state health officials and for local boards of health that may be involved in the selection and development of new local public health directors. Many members of local health boards are not trained in public health and may be appointed to fill codified positions on the local board; yet, they are tasked with hiring and supervising local directors, which may have a significant positive or negative impact on the public health agency. Boards of health should not only account for the health needs of their communities, but should also consider carefully the qualities and aspects of leaders they desire in their health director. While basic comprehension of public health services and systems may be fundamental as a qualification, if board members want a director to merely manage the books and tend to the basic tasks of clinical and environment public health, or if the health department may not have a fiscal or political environment conducive to innovation and change, they should

look for a more transactional leader. If, however, the board is interested in a director who will challenge the *status quo* by finding creative and innovative ways to improve population health, they should focus their candidate search on more transformational leaders. Providing board members with simple measurement tools to identify these leadership styles should be helpful in this process.

Implications for Research

A larger, more comprehensive, and randomized study utilizing 360-degree reviews by supervisors, colleagues, and subordinates could improve the measurement of public health leaders and the understanding of the qualities and characteristics that may contribute to effective public health practice. Such measures of leader attributes and skills as used in this study could be combined with more discrete measures of organizational performance to further illuminate the effect of leader style on outcomes. Further, thousands of public health leaders have been trained in state, territorial, regional, and national public health leadership institutes under the reasonable assumption that such training and development efforts improve the practice of public health. The Centers for Disease Control and Prevention (CDC), the Health Research Services Administration (HRSA), and others have invested tens of millions of dollars in these activities over the past two decades. As funding becomes increasingly limited and risks being diverted from leadership development activities, measures should be developed to objectively evaluate such activities. These measures should examine improvements in organizational financial performance, staff turnover, employee satisfaction, or other common and consistent metrics. Research into these topics should contribute substantively to the pillars of workforce research and development: enumeration, competency, and capacity.

Limitations

Quantitative limitations include a small sample size and the use of self-reported data. Since responses were identifiable to the researcher and since an interpretive report was to be provided, it is plausible that participants may have been motivated to over-report what they felt were positive characteristics while under-reporting what they believed to be negative characteristics of leaders. Further, the sample of participants was randomly selected from a pre-identified pool of health department directors. It is possible that since most of the participants were white, female, and identified themselves as leading rural health departments, that these demographic factors have a significant influence on the styles of leadership practiced, preferred, or perceived to contribute to effective leadership outcomes. We did not examine how our sample compared to all US local health department directors. However, by focusing on non-urban directors and randomizing the selection, we believe our sample to be fairly representative. Sampling bias is a concern for this study, but one we accepted given the mixed-method nature of the overall study. The purpose of this study was not only to measure leadership styles, as described in this study, but also to purposefully examine transformational and transactional leaders in context. We note that caution should be taken when interpreting findings since while statistical significance was found for many measures, the small sample size and quasi-random sampling limit the generalizability of findings.

Conclusion

In a time when healthcare, public health, and population health issues are being transformed, the critical importance of more fully understanding public health leadership cannot be understated. This study offers one quantitative perspective on the role of transformational leadership qualities in public health. Clearly, more detailed and in depth understanding is needed if we are to inform our educational and professional workforce development models related to public health leadership. Additional findings from a qualitative companion study are presented in the adjoining Part 2 paper.

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Full-range public health leadership, part 2: qualitative analysis and synthesis

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Public health leadership is an important topic in the era of U.S. health reform, population health innovation, and health system transformation. This study utilized the full-range leadership model in order to examine the public health leadership. We sought to understand local public health leadership from the perspective of local health department leaders and those who work with and for them. Public health leadership was explored through interviews and focus groups with directors ($n = 4$) and staff ($n = 33$) from local health departments. Qualitative analytic methods included reflexive journals, code-recode procedures, and member checking, with analysis facilitated by Atlas.ti v.6.0. Qualitative results supported and expanded upon previously reported quantitative findings. Leading by example and providing individual consideration to followers were found to be more important than other leader factors, such as intellectual stimulation, inspirational motivation, or idealized attributes of leaders. Having a clear and competent vision of public health, being able to work collaboratively with other community agencies, and addressing the current challenges to public health with creativity and innovation were also important findings. Idealized leadership behaviors and individual consideration should be the focus of student and professional development. Models that incorporate contextual considerations, such as the situational leadership model, could be utilized to ensure that optimal individual consideration is given to followers.

Keywords: public health leadership, multifactor leadership questionnaire, public health workforce development, transformational leadership, local health department, full-range leadership

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Introduction

In an era of health reform, population health innovation, and health system transformation, issues, such as workforce development, management, and leadership, are central to the future of public health (1, 2). Public health problems are at once fascinating, frustrating, and inspiring, requiring public health leaders to engage multiple stakeholders in activities that, by their very nature, are public and open to broad scrutiny and debate (3). Effective public health leadership has never been more important, as current public health issues require leaders who are as skilled and astute politically as they are at managing the technical and logistical aspects of public health (4–6). Knowing the requisite skills, abilities, and styles of leaders can assist public health governance boards to select ideal candidates for leadership positions, aid public health leaders in promoting and developing leaders within their organizations, and guide trainers and educators in designing programs that ensure a

workforce capable of leading public health in the future. Consequently, a better understanding of public health leadership is warranted to assure that leaders are able to meet current public health challenges.

Leadership is now at the forefront of research and practice-oriented efforts related to public health systems, services, and workforce issues (7–10). Previous studies have consistently drawn a link between a competent public health workforce and better public health outcomes, including improvements in the overall public health infrastructure (11–14).

The full-range leadership model establishes transformational, transactional, and passive-avoidant leadership styles, along with nine sub-styles of these categories, and examines the direct and indirect influence(s) of certain leadership styles on interpersonal relationships and organizational performance. [See Part 1 of this study, Carlton et al. (15), for a detailed description of each of these leadership styles and sub-styles]. Transformational leadership is often linked to improved quality, employee satisfaction, increased productivity, and better perceived leadership efficacy (16–21) while transactional and passive-avoidant (laissez-faire) leadership is seen as a prescription for mediocrity (22, 23). Academic competency models and public health workforce development programs frame a vision for public health leadership that preferences transformational, change-agent leaders who possess characteristics of transformational leadership, such as charisma and vision (24–26).

The amount of personal and/or positional power, the amount of employee resistance, the level and direction of employee motivation, the type of job, and even the personal and positional distance between leaders and followers can all significantly determine the type of leadership style that is not only feasible, but also preferable (27–30). Previous research has demonstrated the reciprocal influence of leaders and followers and each other's behaviors and performance (31). Further, individual follower development, values, and personality, including connectedness and affect, may largely determine the extent to which transformational and/or transactional leadership is required (32–35). Similarity between leader and follower(s) in terms of values, personality, and goals is a strong predictor of preferred and actual leadership style (36). Further, a shared understanding of leadership style between leader and follower(s) is more strongly correlated with performance, behavior, commitment, and trust for transactional than for transformational leadership (37). Employee motivation, commitment, and relationships with supervisors are powerful determinants of transformational leadership (38). Consequently, leadership behavior may be heavily dependent on specific situations. Some authors even suggest that gender is an important consideration in the leader-follower dynamic (39).

Organizational and cultural influences on leadership, leadership expectations, leadership behaviors, and leadership efficacy must also be inserted into any equation of leadership theory. Studies have shown that cultural expectations of leadership can have a large impact on trust in leaders as well as perceptions of leader competence (40–42). The type of organization may be another important consideration (43). Some authors have found that a transformational style of leadership, as perceived by followers, is more prevalent in private than public health care settings (44). Indeed, organizational context may have a profound impact on perceived and actualized transactional and transformational leadership behaviors (40) and can greatly influence how, where, and what forms of leadership – either transactional or transformational – are possible (23, 45). Some authors have found that charismatic and transformational styles of leadership do not correlate with performance in public sector organizations (44, 46). One recent study found that in certain contexts, such as in the public sector, a transactional leadership style may be more predictive of organizational performance than a transformational leadership style (47). The posited ideal of transformational public health leadership may not fully account for how these follower and organizational dynamics influence the manner in which leadership can be actualized.

Despite this expansive body of literature on the full-range leadership model, no effort had yet been made to apply this model to the study of public health leadership. In the preceding companion paper, we reported the quantitative findings from a detailed mixed-method study on full-range leadership among local public health leaders. Specifically, transformational leadership styles among local health department leaders in one American state (Kentucky) were found to be highly correlated with better leadership outcomes (perceived performance, employee satisfaction, extra effort); whereas transactional leadership was not found to be correlated with these outcomes. These findings suggested that transformational leadership may be a more effective style among local health department leaders. Indeed, this is consistent with much of the literature, competencies, definitions, and guiding documents pertaining to public health leadership, which seem to preference transformational styles of leadership.

Still, while transformational leadership qualities may enable public health leaders to engage communities in efforts to improve population health, the full range of leadership qualities, including the technical and managerial acumen necessary not only to lead change, but to effectively attend to general and regular organizational tasks and responsibilities should not be overlooked. Indeed, Avolio and Bass (48) clearly state that leaders cannot be truly transformational without also possessing and leveraging strong transactional leadership abilities. Therefore, we hypothesized that given the often-technical demands of local public health delivery, a broader range of leadership abilities may be necessary, including additional transactional leadership qualities, which may often be overlooked in idealized visions of leaders. Consequently, an understanding of local public health leadership informed by public health leaders and their followers is warranted.

Purpose

This study utilized the full-range leadership model in order to examine public health leadership. Our purpose was to understand local public health leadership styles from the perspectives of local health department leaders and their staffs. Guided by an interest in optimizing workforce development and leadership training activities, our primary research question was, "What leadership style(s) is/are most appropriate for effective leadership in local health departments?"

Materials and Methods

Following the quantitative identification of transformational and transactional leadership tendencies in health department directors (see Part 1), interviews and focus groups were used to more fully understand the nature and practice of such leadership styles in public health settings. The purpose of these interviews and focus groups was to illuminate the situations and circumstances that facilitate or inhibit these styles from being employed. Using a semi-structured interview and discussion guide (**Box 1**), four directors were interviewed regarding their perspectives and experiences with public health leadership. Additionally, in each of these local health departments, focus groups were conducted with as many members of the executive team and general staff of the health departments as feasible, generally 10 to 12 individuals. A total of 33 individuals participated in four focus groups. The focus of these groups was also on perspectives and experiences with public health leadership, and discussion was likewise facilitated using the same semi-structured guide (**Box 1**).

Participants

Four local health department directors who participated in the quantitative phase of this study were randomly selected and interviewed. Upon completion of the interviews, the directors were asked if they would allow their employees to participate in a focus group concerning public health leadership. Dates and times were coordinated with the director and advertised to all employees via posters and email. Participation in the focus group activities was maximized by arranging to have the focus group convene at a mealtime in a conference room in the local health department and by coordinating work schedules and availability of interested employees with the health department director. No incentives were provided for either interview or focus group participants. To ensure that employees were open to discuss their thoughts and feelings, the directors did not attend the focus groups.

Demographics of interview and focus group participants were obtained including: gender (male or female), age (18–25, 26–35, 36–45, 46–55, and over 55), highest education completed (high school, associate's degree, bachelor's degree, master's degree, doctoral degree, or their equivalents), whether participants had a professional public health degree (MPH, DrPH), and how many years of public health work experience they had (<1, 1–5, 6–10, 11–20, more than 20).

BOX 1 | Semi-structured interview/focus group discussion guide.

1. Please describe the ideal qualities of public health leaders.
2. What is expected of leaders in your health department? How do you know this? [After reviewing definitions of transformational and transactional leadership styles]:
3. What are your thoughts on these leadership styles?
4. What type of leadership do you perceive to be generally employed in your health department?
5. What factors do or may encourage the use of a more transformational style of leadership in your health department?
6. What factors do or may encourage the use of a more transactional style of leadership in your health department?
7. How is leadership (or how are leaders) developed in your health department?

Qualitative Methods and Analysis

The primary method of qualitative data collection was semi-structured interviews with local health department directors and focus groups with local health department staff. According to Creswell (49), interviews have the advantage of allowing researchers to gain historical information and to control the line of questioning. Conversely, interviews are more intimate and personal than surveys. Given that the amount of information the participant feels able or willing to share may be limited by the level of trust and/or credibility that the researcher has established with the participant(s), we used an approach that allowed interviews and focus groups to be more conversational and fluid. Leveraging an active, depth interviewing approach (50, 51), these interviews and focus groups followed a general outline of open-ended questions; then, as led by participants, the researcher more deeply explored the aspects of their experience and/or perspective not otherwise captured by a previously scripted question. Interviews and focus groups varied in length and detail depending on participant responses and the depth achieved in the interview. Most interviews lasted approximately 1 h, with focus groups averaging about an hour and a half.

In the emergent nature of qualitative research, data analysis is a highly reflective process for the researcher (49). To support this critical reflective process and to help ensure rigor, a reflexive field journal (52) was used to record the researcher's reactions to each interview, the themes that seemed to be developing, and the researchers' thoughts and reflections. These processes allowed the researchers not only to recall the aspects of each interview or focus groups, but also to identify potential biases that could have colored the research. Interviews were recorded on a digital audio recorder while the researchers simultaneously made hand-written field journal notes. Krefting (52) suggests that these notes aid researchers in recalling specific themes from the interviews/focus groups, to guide follow-up questions during the interviews/focus groups, and to aid in processing his/her experience of these interactions with participants.

Upon completion of the interviews and focus groups, the audio files were transcribed professionally and reviewed to ensure the accuracy, completeness, and timeliness of data analysis. Transcription quality is a fundamental component of qualitative rigor. Not only is accurately capturing what was said important, but also just as important is capturing how it was said (53). The digital audio files were electronically transmitted using secure file transfer protocols to a professional medical transcriptionist. To add additional layers of confidentiality, the digital files were devoid of audio or electronic identifiers that could be linked to the participant(s).

To facilitate the analysis and ensure the validity and credibility of the qualitative data gathered in this study, the Atlas.ti v6.0 software package was used to facilitate retrieval, filtering, and grouping of participants' statements, thus enabling the development of qualitative themes and mapping key concepts. Researchers have noted the important role of computer-assisted qualitative data analysis software (CAQDAS) packages have afforded researchers to enhance the efficiency, depth, and rigor of their qualitative studies (54, 55).

To ensure the reliability of the data, a code–recode procedure was used. This procedure involved coding a portion of the interview data using an initial coding scheme developed based on our initial review of the transcripts and field journal notes from the interviews and focus groups. We then returned to the data 2 weeks later and recoded it. The results of these distinct coding sessions were compared to ensure that coding was performed consistently. A formal coding scheme was then finalized and the data analyzed using the software.

As core themes and concepts emerged from the data analysis, a member-checking procedure (52, 56) was used. This procedure involved providing data to research participants for comments and further response. Participant responses helped clarify themes and implications of results. Essentially, research participants were the ones who validated the study findings.

This study was conducted with approval of the University of Kentucky Institutional Review Board.

Results

Participant Demographics

Demographic information of participants in this phase of the study is provided in **Table 1**. Thirty-seven local health department staff members participated in the qualitative phase of the study. This included four health department directors who had completed the earlier survey phase. These directors were interviewed separately from their staff members, who participated in focus groups.

Who are Public Health Leaders?

Without fail, participants across all focus groups and interviews identified leadership less as a positional attribute and more as a personal quality. That is to say, an individual's title as a director of a public health department, a divisional manager within a health department, or even a public health nurse without supervisory responsibilities does not determine whether or not that individual is a leader in the public health department. One nurse manager participating in a focus group said,

> . . .Maybe even leadership doesn't necessarily have to be in a supervisory role. . .I have a group of clinic nurses who all work doing the same job and yet there are some who have skills that are easily evident, identifiable, and they are willing to step up into leadership roles and that doesn't mean take a supervisory position. Supervision is not necessarily leadership, leadership is not necessarily tied to titles.

This comment was echoed by other focus group participants. Given the focus group comments, leadership in local public health departments is as much a function of the personal qualities and behaviors of individuals as it is of the positions or titles they hold.

Ideal Qualities of Public Health Leaders

Participants in interviews and focus groups identified several qualities or attributes of public health leaders they felt were ideal. Those qualities most often discussed by participants (i.e., frequency or how many discrete times the qualities were mentioned by participants) are shown in **Table 2**. These include aspects of leadership focused on other people, such as providing for or facilitating staff development/training; people-oriented relationships skills and individualized consideration and sensitivity; and delegation, empowerment, collaboration, and engagement. Leader behaviors exhibited through leading by example, modeling, and mentoring were also identified as ideal qualities. Creativity and innovation were very frequently discussed by participants, as was having vision and foresight. Leader competence in the form of basic management skills, understanding the fundamentals of public health practice and public health systems, and credibility were seen as not only ideal, but essential to public

TABLE 1 | Demographics of Phase 2 participants ($n = 37$).

Background information	Participants ($n = 37$)
Gender	
Male	5 (13%)
Female	32 (87%)
Age	
18–25	0 (0%)
26–35	13 (35%)
36–45	8 (22%)
46–55	12 (32%)
55+	4 (11%)
Highest education completed	
High school/associate's degree	17 (46%)
Bachelor's degree	11 (30%)
Master's degree	9 (24%)
Doctoral degree	0 (0%)
Public health degree (MPH, DRPH)	
Yes	7 (19%)
No	30 (81%)
Years of public health work experience	
<1	0 (0%)
1–5	12 (32%)
6–10	8 (22%)
11–20	15 (41%)
20+	2 (5%)

TABLE 2 | Ideal qualities of public health leaders, by number of times (frequency) mentioned by participants.

Leader attributes	Frequency
Staff development focused, training	25
Individual consideration, relationship skills, people-oriented, supportive, encouragement, sensitivity	25
Delegation, empowerment, engagement, collaboration	22
Creative and innovative	20
Leading by example, modeling, mentoring	18
Practical management skills, competence, basics of public health, knowledgeable, credibility, work ethic	17
Vision, foresight	15
Motivational, inspirational, passionate	15
Communication skills, incl. clarity, listening	13
Adaptability, flexibility, open to change	13
Decisiveness, good decision-making skills	9
Open to influence	7

health leadership. Other ideal qualities of public health leaders included: being motivational, inspirational, and passionate; having and using good communication skills; being adaptable, flexible, and open to change; being decisive and having good decision-making skills; and being open to the influence of others. Other qualities mentioned by participants, but not shown in **Table 2**, include: being accountable and fostering accountability, professionalism, having a sense of humor, being humble, showing initiative, being fair, and possessing self-awareness and integrity.

Several themes concerning public health leadership styles and approaches emerged from the interviews and focus groups. Themes included balancing transformational and transactional leadership styles, leading by example, collaboratively engaging with followers, using transactional leadership when appropriate, and providing individual consideration to followers through situational-type leadership. Each of these themes is discussed in detail below.

Balance of Leadership Styles

Much is expected of public health leaders. One public health director described his leadership role very succinctly, capturing several of the thoughts offered by other interview and focus group participants. Of his job as director, he said:

> I've always perceived my job as being broken down into thirds. One-third is day-to-day management, where I answer emails, answer phone calls, take appointments, work with students and whatever other issue comes up. One-third of my job is doing what I call staff development: looking for places within the organization where I can acknowledge efforts of employees and just go in and visit with people and talk with people and sending our employee awards and doing things along that line. The other third is trying to figure out how to be better, how to be innovative, how to make the community better.

When given definitions of transformational and transactional leadership styles, most participants showed a preference for the transformational style of leadership. While the attributes and behaviors of transformational leaders are preferenced, nearly all participants indicated that in local public health departments, leaders need a more blended leadership style, one that could be adapted to situational requirements, including major public health events, individual staff needs, and the general activities of certain departments. It was noted that leaders need to be aware of their preferred style, so that they can develop and utilize other leadership styles as needed.

The need for a blended or versatile leadership style was also recognized by front-line staff members. Highlighting how the situation or context would dictate the appropriate leadership style, one participant stated: "It is very difficult, no matter how hard you try to be inspirational or motivational and challenge folks, in terms of doing the job every day. You reach a limit where you have to stop challenging people and motivating them and just say, 'Just do it.'"

Participants were clear that transformational and transactional leadership styles are not mutually exclusive. Some specific circumstances may require different leadership styles. For example, one focus group participant explained how public health accreditation efforts might require both transformational and transactional leadership in order to be successful:

> We're on the road to accreditation and one of the things with that is standardization. Everybody doing the same thing so it's more transactional, but the journey to get there and how to motivate each of those employees and supervisors to help us reach that step could definitely be transformational.

Finally, participants felt that leaders' desired outcomes or goals may well be what ultimately determine the use of different leadership styles.

Visionary Leadership

Nearly all those who participated in this phase of the study identified visionary leadership as an ideal quality of leaders. Vision in public health leadership seems to be as much about the internal organization as it is about the larger organizational context – the community served by the health department. The motivation to innovate or be creative can come from this vision of the public's health and a desire to have a positive influence on the population. It may also be an unwillingness to let the current health status continue:

> A public health leader needs is to be dissatisfied with the state of affairs. . .If you're satisfied it's unlikely that you will ever be creative or motivated to try to be something better or different. If you're just willing to be the *status quo*, the *status quo* is not good enough. You have to understand that. It's not. The *status quo* is not good enough.

Leading By Example

One of the most consistent and necessary aspects of leadership addressed by participants was that of leading by example. As much as any other quality, participants felt that a leader's behaviors were essential to their leadership. Said one director, "You have to get out and work side-by-side with your people. You have to demonstrate to them that you're willing to do everything that you're asking them to do. . .I know that I set the tone through my words and actions."

Both directors and staff members addressed the importance of leading by example. Staff members especially indicated how the criticality of leading by example to team building and leader credibility. One supervisory staff member, who happens to work for the director quoted just above, said, "Leaders are expected to be role models. They're expected to model the behavior that we'd like to see out of anyone."

Collaboration and Engagement

One of the most important ways leaders are able to lead by example is by listening to, engaging, and collaborating with others. Participants said that this was as important for internal staff

members as it was for external community partners. Building collaborative relationships with community partners was part of the visionary leadership quality described above. Participants indicated that a leader needs to have a broad vision of public health that encompasses both the public health agency and also includes the entire public health system. Participants also expressed the importance of being open to influence by others to allow for collaboration to occur.

The Role of Transactional Leadership

The context of public health work is an important consideration for public health leaders. Several participants spoke vociferously about how the daily realities of public health work necessitate various leadership styles. One participant, a clinical nurse manager, felt that the daily work of public health could be so codified that it might largely determine how leaders need to approach their roles. She said, "The transformational sounds wonderful if you had the time to sit and conceptualize and plan and think all day long, but a lot of work of the day is actually the transactional work just because things have to get done." She strongly suggested that effective transactional leadership may be very important to much of public health practice. Indeed, the pervasiveness of transactional leadership in public health was evident in discussions with focus group participants. A number of front-line staff with some supervisory experience, most with over 10 years of public health experience, did not exclude transformational leadership, but they suggested that many tasks in public health practice did not lend themselves to being transformed due to the daily realities of public health practice.

Individual Consideration and the Situational Leader

One supervisory staff member suggested that the approach to each person must be unique, highlighting one of the overarching themes of the qualitative phase of this study. Each situation is different and thus may demand a very different leadership approach, particularly when working with others. The idea of individual consideration, one of the constructs of transformational leadership, was at the forefront of participants' minds. An important part of individual consideration is, as one participant said, "Finding strengths in everyone and working to maximize those strengths so that everybody is contributing." Consequently, leaders who are able to consider individual circumstances and adapt their leadership accordingly, may be most effective in their leadership roles.

Summary of Key Findings

In summary, several key findings emerged from the qualitative phase of this study. Perhaps, most importantly, participants clearly indicated that local public health leaders should balance transformational and transactional leadership styles. Transformational styles are best received when leaders lead by example and when they collaboratively engage their followers. However, there are times when transactional leadership may be necessary to assure performance or to accomplish specific tasks. According to participants, what is critical is the leader's ability to provide each follower individual consideration and approach that these individual leadership experiences situationally.

Discussion

Using a two-phase, sequential, mixed-method design, this study examined public health leadership through the perspective of local health department directors and their staffs and through lens of the full-range leadership model (48, 57, 58). While this study found a variety of leadership styles and outcomes of leadership among local health department directors, specific aspects of transformational leadership, namely idealized leader behaviors and individual consideration, were significant constructs emerging from the study.

The public health directors interviewed consistently considered leading by example as one of the most important aspects of leadership in public health. Public health practitioners often face many challenges in their work environment, including lower wages than private sector peers, antiquated facilities, prescribed operational protocols, and a severely disadvantaged client population. Followers were clear that when leaders are not willing to do what they ask others to do, they destroy trust, which erodes and may ultimately undermine the leaders' influence. These concepts mirror the models of leader integrity proposed by Grover and Moorman (59) and others (60).

Leaders and followers alike highlighted the role of leader self-awareness and individual consideration. Participants suggested that for leaders to be most effective, they needed to know and operate from their own style preference, as much as is appropriate, while working to determine and utilize the approach(es) that best fit each of their individual followers. This sort of resonance can allow leaders to transcend "siloed" agency functions and create unifying organizational cultures where individual strengths and skills are synergized instead of cannibalized. The concept of authentic leadership is evident in these findings. Authenticity, and thus resonance, in leadership derives from having a clear awareness of strengths and growth areas, values, vision, and expectations of self and others. The presence of these factors can have a profound impact on followers and is deeply empowering to leaders (61).

As leadership was discussed with participants, it became evident that as important as leader behaviors were to leadership outcomes, such as employee trust, satisfaction, and engagement, the contexts in which leader-follower interactions took place were just as important. Many participants discussed the role of relationship building and so-called "people-skills" in determining how leaders should work with others. Also central to the equation were various circumstances inherent and unique to public health practice, such as broad variance in work-related tasks (i.e., sanitation and inspection compared to public health nursing), outbreaks or other public health emergencies, or the demands of community-based collaborative health education and promotion efforts. These vastly differing situations likely necessitate a more adaptive, flexible, and balanced leadership approach that embodies the best of both transformational and transactional leadership, suggesting that a situational leadership approach can be very effective in public health settings.

Implications for Practice

This study has important implications for public health practitioners. One of the most significant implications of the study is related to workforce development. Study findings clearly indicate the aspects of leadership that need to be the focus of student and professional workforce development activities, namely idealized leadership behaviors (e.g., leading by example, developing a strong sense of purpose and mission, and making sound decisions) and individualized consideration (e.g., paying attention to each individual's need for achievement and growth by identifying strengths and through mentoring and staff development). In terms of leadership and organizational outcomes, these two aspects of leadership rose above all other aspects of leadership examined. That participants highlighted the parallel importance of more transactional leadership styles suggests that leadership development models should be mindful to be inclusive of these concepts and not merely preference the transformational leadership qualities that have come to dominate public health leadership development approaches.

Continuing Education

Investments in staff development are more comprehensive than leadership or relationship skills education. Participants' responses indicated that simply providing opportunities for staff members to develop skills and abilities not only enhances the level of technical expertise available to improve public health practice, but also enhances loyalty to and engagement with the agency. Employees whose strengths are identified and developed feel greater self-efficacy and, consequently, more empowerment to contribute to the mission of the organization. Therefore, opportunities for specialized training or advanced education, even if the organization is unable to fund these activities, may be useful.

Selection and Hiring

This study has important implications for state health officials and for local boards of health, which may be involved in the selection, and development of new local public health directors. Many members of local health boards are not trained in public health and may be appointed to fill codified positions on the local board; yet, they are tasked with hiring and supervising local directors, which may have a significant positive or negative impact on the public health agency.

Implications for Future Research

Missing from the literature are accurate measures of return on investment for public health workforce development activities. It is one thing to enumerate leadership styles in the hope of developing leaders who more closely portray a given model of leadership. It is entirely different to tie these findings to consistent and objective measures that are meaningful in the management of public health practice. As funding becomes increasingly limited and risks being diverted from leadership development activities, measures should be developed to objectively evaluate the impact of leadership development activities. Studies could look to examine the role of leadership related to improvements in organizational financial performance, staff turnover, employee satisfaction, or other common and consistent metrics. Research into these topics should contribute substantively to the pillars of workforce research and development: enumeration, competency, and capacity.

This study's finding that a more blended, situational style of leadership may be necessary for effective local public health practice draws attention to the role of translational and interdisciplinary research. While the full-range model of leadership that undergirded this study has been used effectively in business and educational research and development activities, it had yet to be employed in a public health setting. Models from business administration, educational leadership, and other fields are constantly being developed, applied, refined, and disseminated. Consequently, business leadership theories and practices may be evolving much more rapidly than similar theories in the health and helping professions, especially public health. This suggests that public health workforce researchers should find ways to translate cutting-edge theories from other disciplines, particularly business administration and educational leadership, so that public health leadership and workforce development efforts keep pace with and inform the larger leadership literature.

Limitations

Limitations include the limited number of focus groups ($n = 4$) conducted. Though relatively robust, the final qualitative sample size ($n = 37$) was somewhat smaller than anticipated. A larger sample of focus groups conducted in a larger number of locations should enhance the qualitative contribution of the study. The study may also be limited in that only suburban and rural health departments were represented, with no representation from urban health departments. Urban environments may demand a different form of leadership – either more transformational or more transactional – than health departments from other geographic locations.

Conclusion

The demands on public health leadership are evolving as rapidly as the environment of health reform, population health innovation, and health system transformation in which it operates. As we develop current and future public health leaders, we would be wise to incorporate a holistic approach to leadership development and to focus on factors that seem to stand out to those working in these settings. For local public health practitioners, idealized leadership behaviors and individualized consideration should be the focus of workforce education and development efforts. Models that incorporate contextual considerations, such as the situational leadership model, should be utilized. Above all, in an era of transformational change in public health, we must remember the vital role of leadership for the public's health and seek to develop leaders who possess the best of both transactional and transformational leadership styles.

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Openness to change: experiential and demographic components of change in local health department leaders

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Background: During the 2008–2010 economic recession, Kentucky local health department (LHD) leaders utilized innovative strategies to maintain their programs. A characteristic of innovative strategy is leader openness to change. Leader demographical research in for-profit organizations has yielded valuable insight into leader openness to change. For LHD leaders, the nature of the association between leader demographic and organizational characteristics on leader openness to change is unknown. The objectives of this study are to identify variation in openness to change by leaders' demographic and organizational characteristics and to characterize the underlying relationships.

Materials and Methods: The study utilized Spearman rank correlations test to determine relationships between leader openness to change (ACQ) and leader and LHD characteristics. To identify differences in the distribution of ACQ scores, Wilcoxon–Mann–Whitney and Kruskal–Wallis non-parametric tests were used, and to adjust for potential confounding, linear regression analysis was performed.

Data: Local health department leaders in the Commonwealth of Kentucky were the unit of analysis. Expenditure and revenue data were available from the state health department. National census data were utilized for county level population estimates. A cross-sectional survey was performed of KY LHD leaders' observable attributes relating to age, gender, race, educational background, leadership experience, and openness to change.

Results: Leaders had relatively high openness to change scores. Spearman correlations between leader ACQ and departmental 2012–2013 revenue and expenditures were statistically significant, as were the differences observed in ACQ by gender and the educational level of the leader. Differences in ACQ score by education level and agency revenue were significant even after adjusting for potential confounders. The analyses imply that there are underlying relationships between leader and LHD characteristics based on leader openness to change.

Keywords: public health leadership, organization theory, openness to change, public health management, workforce development

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Introduction

Local health department (LHD) leaders used innovative strategies to withstand external financial pressures linked to internal quality challenges and service volume during the 2008–2010 economic recession (1). The strategies included charging fees for services and billing insurance, pursuing new funding sources, hiring contractors, utilizing technology, as well as contracting for and/or sharing staff or equipment with other LHDs or non-LHD organizations (2). While several leader characteristics influence the organization's performance, central to the organization's ability to innovate strategically is the leader's openness to change, based on the leader's ability to examine the rationale and need for specific changes (3). Research in organizational and demographic characteristics of for-profit organization leaders have provided valuable insights into the behavior of top executives and their ability to anticipate issues and take action (4). Little is known about the nature of the relationship between openness to change and organizational and demographic characteristics in LHD leaders. This is among the first studies to identify and characterize variations and underlying relationships in LHD leader openness to change.

In public health agencies, leaders' openness to change is of particular interest as LHD leaders are consistently faced with surprises and emergencies (5). In addition to managing the historic cycles of action and inaction associated with public health funding (6), leaders' openness to change is also integral to their ability to control and direct LHDs in a disruptive environment (7). The public expectation that LHD leaders would actively identify financial resources to deliver public health programs (8) during the economic recession is an example of the difficult task that leaders face in finding solutions to problems that are without ready solutions (9).

Background

Studies have identified that in environments of high uncertainty, leaders exert the most influence on change (10). Indifference toward learning from the environment or competitors leads to poor agency performance (11), implying that a leader's openness to change is central to the adaption process, suggesting that leaders determine their organizations' response to a threat or opportunity outside their organizational environment (12) by moving them toward a future state (13). Several organizational and management theory studies have documented the leader's influence on change management (14, 15) and agency performance (16, 17) and the results are mixed concerning the role of the leader in managing change and agency outcomes (18–20). According to organizational theory, a determinant of openness to change is the perception of the leaders (21), which is driven by the leaders' attitudes and perceived control over their ability to implement change. This line of inquiry is not without its critics, who suggest that relying on leader demographic characteristics alone (22, 23) without studying their psychological values and attitudes may lead to spurious conclusions (24). These contrasting perspectives on the importance (25) and non-importance (26) of the individual leader's attributes suggest that although there is no consensus on how demographic attributes drive a leader's openness to change, the individual leader's openness to change is important in managing change.

For public health agencies, the 2002 IOM report on educating public health professionals for the twenty first century in response to the 1988 IOM report's call for the development of the public health workforce in terms of practice and leadership (27) indicated that communities most successful in producing desired health and social outcomes tend to have significant leadership capacity among other agency and community attributes (28). The IOM report, "Variation in Health Care Spending: Target Decision Making, Not Geography" identified that variation over time in utilization of health care services is attributable to decision making that occurs at the level of the each organization (29). In another study, Keane (30) determined that LHD leaders played a significant role as influential decision makers with regard to the privatization of LHD clinical services. These studies suggest that LHD workforce development will benefit from understanding the relationship between the individual leader's demographic characteristics and role in change management.

Theoretical Framework

Change management theories based on agency performance criterion have been studied in multiple organizational structures (31). Theories, including the Theory of Planned Behavior, the Upper Echelon Theory, and the Flexible Leadership Theory, provide the basis for understanding the relationship between characteristics of leaders and LHDs and the individual leader's openness to change.

Theory of Planned Behavior

According to this theory, intention to act is antecedent to behavior. The intention to act is a function of the individual's attitude toward the behavior, subjective norm, and perceived behavioral control. The subjective norm is the individual's belief concerning whether specific people approve or disapprove of a planned behavior, which is the motivator for the individual to behave such as to gain the group's approval (32). Perceived behavioral control is the control an individual exercises when performing a behavior (32). These determinants of intention shape the individual's beliefs about the likely consequences of a specific behavior, expectations of its importance to others, and factors that control behavioral performance. The theory provides a plausible explanation for the interaction between individual attitudes and behaviors (33).

Upper Echelon Theory

Founded on the concept of bounded rationality, this theory suggests that complex information and uncertain situations are not objectively known but merely interpreted through the leader's actions (34). The actions of leaders are in turn guided by their personal interpretation of the situation, and by their personalized construals, values, and personality. Personalized construal in social psychology refers to individual perceptions, comprehension, and interpretation of the world (35) and is a function of experience. The theory suggests that the leaders' demographic characteristics shape the perceptions of leaders and thereby their openness to change. The theory also accounts for managerial discretion, which is latitude of action in the absence of constraints

(36). The concept of managerial discretion explains why some leaders may be more open to change than the others (37).

Flexible Leadership Theory

Conceptualized at the organizational level, the four components of this theory are organizational effectiveness, performance determinants, situational variables, and leadership decisions and actions (38). According to the theory, organizational effectiveness is determined by: (a) efficiency and process reliability, (b) human capital, and (c) adaptation to the external environment. The theory accounts for the agency attributes of organization, capacity, and function in shaping the leader's perception toward change.

Materials and Methods

The units of analysis were the LHD leaders in the Commonwealth of Kentucky. The 59 LHDs of Kentucky assist in providing a likely comparison to the socioeconomic variations observed in LHDs across the United States during the 2008–2010 economic recession. A cross-sectional cohort study design was used to collect data on openness to change and leader demographics and LHD attributes. This study received an exemption from the University of Kentucky's institutional review board based on utilizing data that did not identify individual subjects or put individuals at risk.

Data Sources and Measures

In 2012, primary data were collected on observable demographic attributes of LHD leaders, such as age, gender, race, educational background, leadership experience, and openness toward change. Of the 59 LHDs in Kentucky, responses were received from 47 leaders resulting in a response rate of nearly 80%. The county level population estimates were available from the US Census Bureau annual county population estimates. The 2012–2013 revenues and expenditures for each LHD were obtained from the Kentucky Department of Public Health. To detect and address anomalies in revenues and expenditures and county level population changes, exploratory analyses and descriptive statistics were performed. The responses were compared internally and with existing data to ensure accuracy.

Primary Variable

The openness to change score was measured by Hage and Dewar's instrument (39), which was developed to specifically measure openness to change in leaders of non-profit organizations. The instrument defines openness to change as the degree to which respondents view change favorably and are therefore more inclined to produce change in their organizations. The scale consists of five items, requiring participants to rate the extent to which they agree with each item on a five-point scale ranging from strongly disagree (1) to strongly agree (5). The openness to change score is the sum of rated responses and reflects the self-assessed openness to change score of the respondent. Lower scores reflect a conservative or non-change-seeking attitude whereas high scores represent a more liberal or change-seeking attitude. The Cronbach's alpha test was used to measure the instrument's internal consistency.

Leader Demographic Variables

To account for leader demographic characteristics, data on leader age, race, gender, education level, leader tenure, and leadership experience were collected. Age was treated as a continuous variable. Leader gender, race, and education level were treated as categorical variables. Education level is the highest degree attained, and categorized as Doctoral (DDS, DO, DrPH, DVM, JD, MD, PhD, or other doctoral degrees), or Master (MPH, MSN, MBA, or other master's degree) or Bachelor (BA, BA, BSN, other bachelor degrees), or Associate degree (AD, ASN, other associate degrees). Leader tenure is the self-reported time that respondents have been in their current leadership positions and leadership experience relates to prior executive experience in other LHDs or organizations.

LHD Characteristics

As discussed in the theoretical framework, the agency characteristics of governance structure, and presence or absence of a board of health, medical director, and reserve fund were accounted for in the analysis. The change in LHD population size for 2012–2013 of the overall LHD revenue (multiple resources make up LHD revenues) and expenditure per capita for 2012–2013 were included in the analysis since it is anticipated that these elements influence the leader's openness to change (40, 41).

Analytical Methods

The openness to change score is measured on a Likert scale, resulting in the ACQ score being treated as ordinal data with non-parametric tests used for examining the relationships between leader demographics and LHD characteristics. The Wilcoxon–Mann–Whitney non-parametric test, an analog to the independent samples *t*-test, was utilized to examine the differences in distribution of ACQ score by the leader's gender, race, leadership experience, and the LHD attributes of a board of health, presence of a roll-over reserve fund, and presence of a separate medical director in the LHD. The Kruskal–Wallis test, the non-parametric analog to the ANOVA test, was performed on the leader's highest degree obtained variable and LHD governance structure variable, both of which were treated as ordinal variables with more than two levels. To adjust for relevant potential confounders, linear regression analysis was performed.

Results

Leader and LHD Characteristics

The results in leader characteristics (**Table 1**) demonstrated that the mean age of LHD leaders was 51 years and the average tenure as LHD top executive in current position is 6 years. The 2012–2013 average change in population size was approximately 260 persons with a range of approximately 1,600 persons exiting to about 4,450 persons entering a county (**Table 2**). Although an increase in population size for 2012–2013 was observed, the average 2012–2013 expenditure is approximately 6% less than the 2011–2012 average.

Nearly 62% of leaders were females and approximately 36% were males (**Table 2**). The leadership racial profile demonstrated that over 89% were Caucasian, 4% African American, and 7% of other races. Approximately 45% of the leaders possessed a master's

degree, 28% held bachelor's degrees, 17% a doctoral degree, and the other 10% held and associates or other degree. Over 85% of respondents were first time leaders while approximately 15% had previous leadership experience with other organizations or LHDs. As one of the few states practicing the shared governance model, 68% of Kentucky's LHDs have both state and local governance, 23% have local governance, and about 4% have a state governance structure. More than 90% of all LHDs have a board of health. Over 78% of all LHDs have a reserve roll over funds and approximately 53% of the LHDs have a separate medical director.

TABLE 1 | Leader and local health department characteristics.

Variable	Descriptive statistics			
	Mean	SD	Min	Max
Leader age	51	9.39	30.49	73.72
Leader tenure	6	5.90	0.15	21.75
2012–2013 population change	260	1050	−1662	4456
2011–2012 revenue/capita	179.54	241.98	2.78	1136.99
2012–2013 revenue/capita	100.12	64.31	36.96	312.73
2011–2012 expenditure/capita	99.52	66.75	7.44	363.39
2012–2013 expenditure/capita	95.75	62.44	34.85	305.97

2012–2013 population change = population of 2013 − population of 2012.

TABLE 2 | Leader and local health department characteristics.

Variable	Frequency	Relative frequency
Gender		
Male	17	36.17
Female	29	61.70
Unknown	1	2.13
Race		
White	42	89.36
African American	2	4.26
Others	2	4.26
Unknown	1	2.13
Highest degree obtained		
Doctoral	8	17.02
Master's	21	44.68
Bachelors	13	27.66
Associate degrees	2	4.26
Unknown	3	6.38
Leadership experience		
First timers	40	85.11
Experienced	7	14.89
Governance structure		
State government	2	4.26
Local government	11	23.40
Both state and local	32	68.09
Unknown	2	4.26
Board of health		
Yes, present	44	93.62
No, absent	2	4.26
Unknown	1	2.13
Separate medical director		
Yes	25	53.19
No	22	46.81
Roll over reserve fund		
Yes, present	37	78.72
No, absent	6	12.77
Do not know	3	6.38
Unknown	1	2.13

Relationship between Instrument Elements

To test for internal consistency and assess the strength of the relationship between the five items on the ACQ instrument, the Cronbach Alpha and Pearson Correlation tests were utilized. The Cronbach's alpha of 0.77 is higher than the acceptable value of 0.70 as suggested by Nunnally and Bernstein (42) and implies that the internal consistency of the instrument is reliable. The moderate but statistically significant correlations between the five items (**Table 3**) suggest that there are no large collinearity concerns between the items on the instrument.

Variation in the Leader's Openness to Change

Few leaders strongly disagreed with any of the items on the ACQ instrument. Approximately 2% strongly disagreed that change is refreshing and that the organization becomes a deadening weight over time (**Table 4**). The findings suggest that an overwhelming majority were in agreement with the items on the ACQ instrument. Specifically, over 87% were in agreement (Strongly Agree or Agree) that there is something refreshing about enthusiasm for change, 81% agreed that leaders should be willing to devote more time to change activities, and 95% were in agreement that the current environment warrants an immediate response. Over 88% were in agreement that change must occur not only at an individual level but also at a system level and over 66% were in agreement that any organizational structure becomes a deadening weight over time and needs to be revitalized. For this final question with the lowest rate of agreement – two-thirds – one quarter of responders were neutral.

TABLE 3 | Openness to change intercorrelation matrix.

Intercorrelation matrix				
Q1	**Q2**	**Q3**	**Q4**	**Q5**
–				
0.54***	–			
0.53***	0.29*	–		
0.42**	0.37**	0.39**	–	
0.36**	0.54***	0.24*	0.41**	–

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

TABLE 4 | Variation in openness to change.

Variable	Frequency distribution				
	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Q1			12.77	51.06	36.17
Q2	2.13		17.02	57.45	23.40
Q3		2.13	2.13	72.34	23.40
Q4		2.13	10.64	42.55	44.68
Q5	2.13	6.38	25.53	44.68	21.28

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.
Q1. There is really something refreshing about enthusiasm for change; Q2. If I were to follow my deep convictions, I would devote more time to change movements. This seems to me to be a primary need today; Q3. The current situation in the community calls for change, we should do something now (we must respond at once); Q4. If you want to get anywhere, it is the policy of the system as a whole that needs to be changed, not just the behavior of isolated individuals; Q5. Any organizational structure becomes a deadening weight in time and needs to be revitalized.

TABLE 5 | Spearman correlation matrix for ACQ score, leader and LHD characteristics.

Variable	Spearman correlations							
	1	2	3	4	5	6	7	8
1. Leader age	–							
2. Leader tenure	0.19	–						
3. 2012–2013 population change	−0.03	0.11	–					
4. 2011–2012 revenues/capita	−0.31*	−0.09	−0.47***	–				
5. 2012–2013 revenues/capita	0.12	0.14	−0.31*	0.19	–			
6. 2011–2012 expenditures/capita	0.02	0.11	−0.23	0.24	0.93***	–		
7. 2012–2013 expenditures/capita	0.12	0.13	−0.30*	0.18	0.99***	0.91***	–	
8. Openness to change score	0.17	0.09	0.18	−0.33*	−0.08	−0.16	−0.09	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Associations between ACQ Score by Leader and LHD Attributes

Statistically significant correlations were observed between leader ACQ score, LHD, and leader characteristics (**Table 5**). The negative correlation between leader age and preceding year (2011–2012) revenues may be the determinant of intentions that shape the leader's beliefs about the likely consequences of trying innovative strategies as discussed in the Section "Theory of Planned Behavior." This could also reflect the adaptation element of the Flexible Leadership theory, whereby preference for earlier strategies that have worked (43) override the willingness to be open to change or may be the proxy measure of the leader's educational level (44). The strong correlations between 2012–2013 revenues and expenditures were expected since revenues are integral to the delivery of programs and services (45), which subsequently increase the expenditures of the LHD. The moderately strong, statistically significant, correlations between the leader ACQ score and 2012–2013 revenues, and expenditures are of interest to this study as it suggests an underlying relationship between LHD characteristics and leader openness to change. The positive estimates imply that as the revenues and expenditures increase, leaders may be more willing to try innovative strategies. This reflects the management concept discussed in the Upper Echelon Theory whereby the financial health of the LHD informs leaders' understanding of the situation and subsequently influences their openness to change.

TABLE 6 | Variation in ACQ score by leader and LHD characteristics.

Variable	Mean ranks	*p*
Gender		
Male	18.41	*
Female	26.48	
Race		
White	21.92	*
African American	44.00	
Others	36.00	
Highest degree obtained		
Doctoral	29.31	**
Master's	25.45	
Bachelors	13.31	
Associate Degrees	24.00	
Leadership experience		
First timers	22.75	
Experienced	31.14	
Governance structure		
State government	28.5	
Local government	25.77	
Both state and local	21.70	
Board of health		
Yes, present	23.38	
No, absent	26.00	
Separate medical director		
Yes	22.26	
No	25.97	
Roll over reserve fund		
Yes, present	24.35	
No, absent	20.00	

N = 47; continuity correction included; Mann–Whitney U-tests for gender, race, leadership experience, board of health, roll over reserve fund, and having a separate medical director under Ho: there is no difference in ACQ between samples; Kruskal–Wallis ANOVA test for highest degree obtained and governance structure under Ho: there is no difference in ACQ between samples. All numbers rounded to two decimal places.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Variation in ACQ Score by Leader and LHD Characteristics

The Wilcoxon–Mann–Whitney and Kruskal–Wallis tests provide evidence of statistically significant differences in rank average ACQ (r.a.ACQ) score by leader and LHD characteristics (**Table 6**). The r.a.ACQ score of the male leaders is 18.41 and that of female leaders is 26.48, indicating that female leaders have higher r.a.ACQ scores than male leaders. The significant differences in r.a.ACQ between male and female leaders may be attributed to the differences in leadership style between males and females (46). Studies have identified that women leaders prefer a participatory leadership style, such as transformational leadership, which correlates to female values developed through socialization processes that include building relationships, communication, consensus building, power as influence, and working together for a common purpose (47), all of which are integral for the management of a non-profit, governmental agency, such as an LHD. The significant differences in male and female leaders may also be a proxy measure representing the high number of LHD leaders that are woman and hold a nursing degree (48). In regard to racial diversity, the sample size is too small to make statistically significant conclusions concerning the observed differences in distribution of r.a.ACQ score. The Kruskal–Wallis test for differences in ACQ scores for leaders by the highest degree attained was statistically significant. Those with doctoral degrees had r.a.ACQ = 29; master's degree holders r.a.ACQ = 25; associate and other degree holders r.a.ACQ = 24 and bachelor

TABLE 7 | Leader and LHD predictors of ACQ.

Variable	Estimate	*p*
Revenue/capita 2011–2012	−0.003	*
Gender	−0.89	
Ref: female		
Highest degree obtained		
Associate degrees	−1.74	
Bachelors	−2.63	*
Master's	−0.36	
Ref: doctoral		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

degree holders r.a.ACQ = 13. The leader educational level findings suggest that there are significant differences in the ACQ score based on the level of highest degree obtained by the leader, which corresponds to other study findings that identified important underlying relationships between the levels of education and leader openness to change (49).

Regression Analysis

A backward elimination stepwise regression was utilized to develop a parsimonious model relating leader and LHD characteristics to openness to change. Of the financial metrics, only 2011–2012 revenue was included as 2012–2013 revenue, as well as 2011–2012 and 2012–2013 expenditures were highly collinear. Race also was not included due to lack of variability. Estimates of the final model after adjusting for confounders show that previous year LHD revenue (2011–2012) and educational level of the leader remain significantly associated with ACQ (see **Table 7**). The estimates reflect an interesting association between leader education level and openness to change. Relative to a doctoral degree, having a Bachelor's or Associate degree results in leaders being less open to change. The same is not true for those with a Master's level education implying that there is little difference in openness to change for those with any level of graduate education.

Discussion

The study objectives are informed by the findings of the study. After adjustment for relevant potential confounders, both previous year revenue (2011–2012) and educational level of the leader remain associated with ACQ; however, the effect of gender and current year (2012–2013) revenue and expenditure is no longer statistically significant. The leader and LHD characteristics identified in the analysis correspond to elements of the theoretical framework, such as determinants of intention from the Theory of Planned Behavior, the adaptation element for the Flexible Leadership Theory, and managerial discretion from the Upper Echelon Theory, thus characterizing the nature of interaction between the leader, LHD characteristics, and openness to change. However, several limitations need to be acknowledged, the foremost being the inherent limitation of using a Likert scale self-assessment instrument that only establishes rank order and not the magnitude of openness to change. The small sample size ($n = 47$) limits the application of advanced analytics. The bivariate analyses that are sufficient for meeting the objectives of this study do not inform causal relationships between leader openness to change or leader and LHD characteristics. Also during the time in which the survey was fielded, state public health leaders were strongly encouraging LHD directors to consider operational changes, which may have influenced the leader ACQ score. Since in the analysis, only the 2011–2012 and 2012–2013 revenue, expenditures and population change were studied, this time period may be insufficient for observing the effects of leader and LHD characteristics on openness to change. Future studies will benefit from using a longitudinal study design that involves examining causal relationships between individual leader and LHD openness to change attributes.

Conclusion and Implications

The findings of this study are similar to other openness to change studies (41, 50). In the current context of constant change and ongoing organizational turmoil, the findings are of particular interest to public health workforce development programs that are tasked with preparing leaders to deal with the complex and changing demands of critical public health services (51). Public health workforce development programs would benefit from creating opportunities that emphasize training leaders to recognize the complex interactions between individual leader and agency characteristics based on their openness to change and its subsequent impact on the ability to meet internal and external challenges (52, 53), such as the decline in the number of services offered by LHDs during the 2008–2010 recession (54) and the developing emphasis on emerging infections and deadly pathogens (55). In the interest of the wider public health field, these findings contribute to the literature on leadership attributes and organizational performance (56) that define leadership as a function of the interaction between the social situation and observable demographic characteristics of the leader (57) and the relationship between individual leader's openness to change and agency performance (58).

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