

# Leading the way: competencies of leadership to prevent mis-implementation of public health programs

Sarah Moreland-Russell<sup>1,\*</sup>, Louise Farah Saliba<sup>1</sup>, Emily Rodriguez Weno<sup>1</sup>,  
Romario Smith<sup>1</sup>, Margaret Padek<sup>1</sup> and Ross C. Brownson<sup>2</sup>

<sup>1</sup>Prevention Research Center, Brown School at Washington University in St. Louis, 1 Brookings Drive, St. Louis, MO 63130, USA and <sup>2</sup>Prevention Research Center, Brown School at Washington University in St. Louis; Department of Surgery, Division of Public Health Sciences, Alvin J. Siteman Cancer Center, Washington University School of Medicine, 660 S. Euclid Ave., St. Louis, MO 63110-1010, USA.

\*Correspondence to: S. Moreland-Russell. E-mail: [smoreland-russell@wustl.edu](mailto:smoreland-russell@wustl.edu)

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## Abstract

Public health agencies are increasingly concerned with ensuring that they are maximizing limited resources by delivering effective programs to enhance population-level health outcomes. Preventing mis-implementation (ending effective activities prematurely or continuing ineffective ones) is necessary to sustain public health efforts and resources needed to improve health and well-being. The purpose of this paper is to identify the important qualities of leadership in preventing mis-implementation of public health programs. In 2019, 45 state health department chronic disease employees were interviewed via phone and audio-recorded, and the conversations were transcribed verbatim. Thematic analysis focused on items related to mis-implementation and the manners in which leadership were involved in continuing ineffective programs. Final themes were based on a Public Health Leadership Competency Framework. The following themes emerged from their interviews regarding the important leadership competencies to prevent mis-implementation: ‘(1) leadership and communication; (2) collaborative leadership (3) leadership to adapt programs; (4) leadership and organizational learning and development; and (5) political leadership’. This first of its kind study showed the close interrelationship between

mis-implementation and leadership. Increased attention to public health leader competencies might help to reduce mis-implementation in public health practice and lead to more effective and efficient use of limited resources.

## Introduction

Achieving quality health and well-being has long been a primary focus of public health. However, responding to population healthcare needs in the 21st century has become a daunting task. In the United States, local health departments and state health departments (SHDs) are the primary public health agents responsible for providing essential services [1, 2]. Governmental public health agencies may vary considerably on the planning, delivery, and financing of their services. These agencies, although different in structure and approach, often face similar internal (e.g. staffing and funding) and external (e.g. stakeholder engagement and political will) barriers that make it increasingly difficult to adequately address complex health issues. To this effect, rising healthcare costs coupled with social and political polarization have added impetus to research modern-day public health leadership with high priority [3–5].

Developing, implementing, and sustaining public health programs involve a myriad of decision-making often guided by leader qualities [6, 7].

Leaders in public health must be able to organize, manage and maintain efforts aimed at enabling individuals, families and groups to realize the human right of health and longevity [8]. As a governmental authority, SHDs are tasked with the unique role to recommend public health policies and priorities and to lead their agencies in developing effective programs [9]. Given financial constraints and limitations with reference to funding availability or flexibility, public health leaders are tasked with the unique responsibility to determine whether implementing programs and services are feasible, sustainable, and, more importantly, whether these programs have the potential to yield the intended results.

The term ‘mis-implementation’ refers to public health decision-makers ending effective activities prematurely or continuing ineffective ones. Preliminary research indicates that a substantial amount of mis-implementation occurs in public health departments. Brownson *et al.* found that 36.5% of SHD employees reported that programs that should have continued often end and 24.7% of state respondents reported that programs often or always continue when they should have ended [10, 11]. Preventing program mis-implementation is, therefore, necessary to sustain public health efforts and resources needed to improve health and well-being. Executive management is often responsible for making or implementing decisions such as approving or disapproving the continuance of a program. Therefore, it is important to understand the competencies of public health leaders in preventing program mis-implementation. In this paper, we refer to an attribute as a quality or feature characteristic of a leader. Competencies are ‘composites of individual attributes (knowledge, skills, and attitudinal or personal aspects) that represent context-bound productivity’ [12]. Developing competencies to enhance leadership in public health is crucial and is noted in the Public Health Leadership Competency Framework. This framework was designed by academic and public health practitioners to inform and provide leadership curriculum to public health professionals and to review leadership development [13].

The purpose of this paper is to identify the important competencies of leadership in preventing the mis-implementation of public health programs. We employed qualitative interviewing and thematic analysis to identify the main themes that outline leadership competencies that affect mis-implementation. The findings from this paper are helpful in informing the development of public health leadership and content of future leadership training to prevent mis-implementation of public health programs within state and local public health departments.

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## Methods

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This study involved qualitative interviews with 45 public health professionals across eight states. This reporting of methods and results followed the Consolidated criteria for reporting qualitative research (CORE-Q) guidelines for reporting and used a qualitative approach. Interviews were conducted over the phone by four members of the research team during a five-month period (February–June 2019). The interviews were audio-recorded and professionally transcribed (rev.com). Verbal consent was obtained prior to each interview, and ethical approval for this study was provided by the Washington University in St Louis Institutional Review Board (IRB# 201812062).

### Study participants

The participant states ( $n = 8$ ) were selected based on the level of mis-implementation (high and low), geographic diversity and population density and makeup. Mis-implementation levels were determined based on previous data collected as part of a national survey [14]. Details about the participants’ recruitment are available [15]. We initially reached out to over 200 individuals who fit our selection criteria. Up to three emails and two phone calls were made to potential participants, inviting them to schedule an interview. A total of 45 participants were interviewed. The team believed that we

reached saturation at this point after reviewing the transcript content.

### Interview guide development

The interview guide questions focused on the relationship between mis-implementation and organizational, individual and external factors [16]. The final interview guide included a description of the purpose of our research—to learn about decision-making processes, facilitators and barriers for continuing ineffective chronic disease programs. Respondents were asked to recall a particular program in which mis-implementation occurred (i.e. an ineffective program continued) and then asked a series of broad, open-ended questions followed by more specific questions to gain a more detailed response from participants. The main themes of the interview guide were developed from the results of the national quantitative survey from phase one of this project in which mis-implementation was assessed and described [17]. Questions were refined with input from the research team and stakeholder advisory board. The interview guide was pilot tested with a study advisor who was a recently retired SHD practitioner. The interview guide questions were provided to the respondents prior to the interview.

### Data analysis

Thematic analysis of the qualitative responses was conducted using a deductive approach, in which the authors referenced their codebook to guide the process. The codebook consisted of nine parent codes and a number of sub-codes. Codes were defined based on the original interview guide, which focused on understanding how and why mis-implementation occurred. For the purposes of this study, we focused on the primary codes regarding the role of leadership in the mis-implementation of chronic disease programs. The transcribed interviews were de-identified by the authors and uploaded to NVivo 12. The transcripts were randomly assigned and distributed to five research team members for coding. Thereafter, the team members conducted consensus coding in

**Table I.** Demographic characteristics of state-level health department practitioners who participated in interviews on decision-making around program adaptation in the United States, 2019

Characteristics	Respondents (N = 45) n (%) <sup>a</sup>
Gender	
Female	44 (98)
Male	1 (2)
Position	
Program Manager or Coordinator	29 (64)
Director overseeing multiple programs in a section, bureau or division	10 (22)
Evaluator	2 (4)
Epidemiologist	2 (4)
Other (analyst, clinical care liaison)	2 (4)
Time spent in current position	
≤5 years	26 (58)
6–10 years	9 (20)
≥11 years	7 (16)
Time spent in current agency	
≤5 years	17 (38)
6–10 years	10 (22)
≥11 years	17 (38)
Time spent in public health overall	
≤5 years	4 (9)
6–10 years	13 (29)
≥11 years	26 (58)

<sup>a</sup>Participants came from eight states representing all US Census Bureau regions, including Northeast (three states), South (two states), Midwest (two states) and West (one state).

pairs for all transcripts, and differences between coders were discussed. When coders were unable to reach consensus, a third team member facilitated the process to achieve consensus. Upon completing consensus coding, five team members identified and summarized sub-themes. Once these were completed, a comparison was conducted to identify overlapping themes. The Public Health Leadership Competency Framework [13] was used to structure the final themes and sub-themes presented in this paper.

## Results

Information regarding the 45 SHD employees interviewed is included in Table I. On average, the interviews took 43 min. All but one participant

was female. The average time in their agency was 11 years, with 15 years of experience working in public health. The majority of respondents were at the Program Manager or Section Director level within their organization.

Table II outlines our main themes aligned with components from the Public Health Leadership Competency Framework that emerged from interviews regarding the important leadership competencies to prevent mis-implementation: (i) 'leadership and communication; (ii) collaborative leadership (iii) leadership to adapt programs; (iv) leadership and organizational learning and development; and (v) political leadership'.

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### Leadership and communication

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Several of our findings aligned with competencies outlined in the leadership and communication domain of the Public Health Leadership Competency Framework as being important to prevent mis-implementation; specifically, effectively sharing information and responsibility at different organizational levels and exercising the sensitivity needed to communicate with diverse cultures and disciplines.

#### Effectively sharing information and responsibility at different organizational levels

Characteristics of strong leadership included being in constant and transparent communication with staff about the status of programs and issues. Leaders achieved this contact through regularly scheduled meetings and reports with multiple staff across the organization. Respondents also noted that being transparent about programs and about their expectations for their staff were important attributes to prevent mis-implementation.

There are monthly and quarterly reports and just ongoing communications. So we pretty much know on a monthly basis what kind of traffic any

particular program might be having and what the issues might be, challenges, the good things, the success stories, etc.

Respondents also reported communication issues with and from leaders. Some respondents reported frustrations with how leaders received their feedback and with a lack of transparency in leadership communication. Respondents reported that staff sometimes had to spend lots of time communicating with leadership without much response or attention paid to an issue.

There was an interim public health commissioner who we met with twice a week for, I don't know how long. They basically thought the program was horrible. And so we had to keep bringing data and bringing data to show him that, every objection he came to, we were able to find data to show... It was very painstaking and it was frustrating to have to do that because meanwhile again, we could have been, doing something else with those funds.

Other respondents reported unclear and non-transparent communications with leadership. Some respondents reported that leadership was unclear with the direction that they wanted to take with a program. Other participants reported that how decisions were made by leadership was not communicated clearly to them.

There could be someone above you who can kind of make a push on a higher level and they make the decision, but when it gets to you as a program manager it may come across as coming from someone else you know. You will not really know who made the decision.

#### Sensitivity needed to communicate with diverse cultures and disciplines

Respondents reported that leadership that promotes respect and consistent communication with partners within the community and who provide their staff the opportunity to engage partners were most effective in preventing mis-implementation.

**Table II.** Themes guided by the Public Health Leadership Competency Framework and example quotes from interviews with state-level health department staff in the United States (2019)

Domain	Elements within domain	Example quotes
Leadership and communication	Effectively sharing information and responsibility at different organizational levels	'I will continue to give the authority to the division directors to run their programs as they see fit. And allowing for a review of how things go is what I'm looking at. So they know what they're doing and they know what my expectations are.'
	Sensitivity to communicate with diverse cultures	'I think that there's lots of leadership support to maintaining excellent relations with our communities and the programs that we're administering, making sure we're accommodating their needs'
Collaborative leadership	Providing an environment conducive to opinion sharing	'Our leadership is very supportive, specifically up the commissioner's level. We have an open-door policy with our commissioner so that's the way. If we see something, we can always go discuss it.'
	Offer opportunities for collaborative learning and quality improvement	'We try to have a very collaborative decision-making process. I don't know the last time that I personally came forward and said, "As your manager, you will no longer do X, Y, Z."'
	Modeling effective group process behaviors	'We're organized into teams and into structures that continue and promote effective work and building off each other.'
Leadership to adapt programs	Facilitating reassessment and adaptation	'We have an office of public health and performance management, and one of their tasks is quality improvement, so they do participate in our program and the plan new study act, and they have a quality improvement coordinator who implements rapid improvement events in different departments within our agency.'
	Serving as a driving force for change	'I would say [changes are managed most effectively when] it's well thought out and we really consider the process and how we're going to roll it out.'
Leadership and organizational learning and development	Identify and communicate new system structures as needs are identified and opportunity arises	'I like to think that we're pretty effective when we do make a change and go in a different direction that it affective in the terms of communicating it, of trying to get people on board.'
	Advocate for learning opportunities	'We participate on national calls so we would frequently stay up to date on changing evidence and changing policy that came out of CDC. We're literally looking at, if you will, what's being put out on that national agenda and that national stage at that time.'
	Foster an environment of trust	'I think that's really helpful with having the consistency of, for example, staff meetings or one on ones [with upper management]. All of those opportunities to share really make it then more comfortable and then easy for addressing circumstances that arise.'
Political leadership	Advocate and participate in public health policy initiatives	'I think that there's lots of leadership support to maintaining excellent relations with our communities and the programs that we're administering.'
		'Depending upon the makeup of your legislature determines which policies are passed and which ones are promoted. So, fortunately here in [name of the State redacted] we've had leadership that has been more in tune with health related topics.'

(continued)

**Table II.** (Continued)

Domain	Elements within domain	Example quotes
	Understand and apply effective techniques for working with boards and governance structures	‘There are factors like overall we have a very conservative legislature, so we have to have a sense of receptivity to issues we work on. Probably most dramatically we’ve encountered those issues because we do a lot of public campaigning. A lot of social media work and TV ads and that kind of thing so we have to make sure to write up to the governor’s office before anything gets aired that they’re okay with it.’
	Building alliances, partnerships and coalitions regarding critical issues	‘We had actually more funded partners at the time and I think as it would sound, the community-based coalitions would focus on just a broad strategy to reach any tobacco users in the community that were interested in seeking out cessation classes and then the minority-based coalitions were tasked with serving minority communities specifically’
	Evaluate and determine appropriate actions regarding critical political issues	‘I think that particular program, we had a change in the leadership, and then the person that started is very focused on scalability, sustainability, and outcomes, and the program clearly had no outcomes. She was able to really gain a support of the bureau chief to kind of identify that as an issue, and they were able to shut that down.’

### Collaborative leadership

Collaborative leadership includes the following competencies: providing an environment conducive to opinion sharing; offering opportunities for collaborative learning and quality improvement and modeling effective group process behaviors including listening, dialoguing, negotiating, rewarding, encouraging and motivating. We found that these leadership competencies were also cited as important in preventing mis-implementation.

#### Providing an environment conducive to opinion sharing

Most respondents reported that their leadership promoted upward communication about problems or issues that arise and were open to hearing ideas from staff. Respondents who were leaders also reported trying to be transparent with their staff and that they tried to create opportunities for dialogue about issues that program staff was encountering. Other respondents indicated that their leadership had an open-door policy. Respondents expressed that these open-door policies made it easier to communicate with leadership and allowed them

to more quickly address concerns they had with programs.

#### Offer opportunities for collaborative learning and quality improvement

Respondents reported that in some cases, quality improvement or evaluation results pointed to the need to adapt a program to ensure that mis-implementation would not occur. When respondents reported that they needed to make changes or adaptations in response to evaluation results, those respondents that had leadership who implemented shared decision-making and involved all staff to ensure buy-in were more likely to be supportive of the change.

I think again it really comes down to “Does everybody buy into the change?” If they believe in it or they buy into it or they understand the reasons for the change, they’re more likely to embrace it and do it.

Many respondents indicated that their leaders relied on feedback from their staff to make decisions about programs. Respondents also reported that issues with programs were generally identified

at lower organizational levels and communicated upward to leaders. Respondents reported that they often had back-and-forth conversations or brainstormed with leaders to find solutions to issues.

Our leadership would generally rely on the programmatic folks and the division directors to sort of research and understand what other alternatives would be and to come up with a recommendation.

I think they [leaders] are very supportive. They're very welcoming to new ideas or new approaches for how we're doing this work.

### **Modeling effective group process behaviors including listening, dialoguing, negotiating, rewarding, encouraging and motivating**

Leaders who were collaborative and set up working units that allowed for and were engaged in cross-collaboration and learning were also cited as important in deterring mis-implementation.

We're organized into teams and into structures that continue and promote effective work and building off each other

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### **Leadership to adapt**

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In our review of themes related to the leadership to adapt domain, we identified the following relevant: facilitating reassessment and adaptation; serving as a driving force for change and identifying and communicating new system structures as needs are identified and opportunity arises.

### **Facilitating reassessment and adaptation**

Respondents reported that those programs with leaders who valued quality improvement and required staff to set evaluation objectives were less likely to have continued an ineffective program. Respondents shared that their leadership frequently supported the incorporation of several important continuous quality improvement and other evaluative measures to help them identify ineffective programs and prevent mis-implementation.

The health department as a whole and each bureau in it, including us, would [set] our analytic goals for the year...including, what we're trying to achieve, some of those will surface up to the governor's office. We have continuous quality improvement, where we propose specific things to go through this more formal process. So if we will target something and then go through a whole process it will take say, three four months to go through and come out with a product aimed at improving processes and that kind of thing.

### **Serving as a driving force for change**

In addition, respondents reported that leaders who coordinated rigorous planning efforts both with internal and external partners and who considered the diversity in capacity among partners were most effective in implementing changes to programs.

We have to flex [our changes] to that diversity [or partners]. If we don't, then we're defeated from the get go. 'Cause we're gonna ask counties to do things they just can't get to unless we really work with them.

### **Identify and communicate new system structures as needs are identified and opportunity arises**

Finally, respondents felt that leaders who were most effective in adapting or changing programs to prevent mis-implementation effectively communicated programmatic changes to partnerships and actually included communication with these partners as part of planning efforts.

It is just making sure that they have understanding about the reason for the change and then knowing how to make those changes.

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### **Leadership and organizational learning and development**

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In our review of themes related to the leadership and organizational learning and development domain, advocating for learning opportunities and

fostering an environment of trust aligned with our findings.

### **Advocate for learning opportunities**

Respondents cited that leadership that encouraged staff to learn from others—both within the organization and from other states or programs—was helpful in ensuring the implementation of evidence-based programing and preventing mis-implementation.

We look a lot to other states. We are members of the Association of Territorial and State Dental Directors and this is our go to for all sorts of information about evidence based public health. What works, what doesn't work. And they have a huge network and there's virtually all the states participate in this network and there's a lot of knowledge sharing and it's excellent. We couldn't do our work without them, honestly.

Being allowed to regularly attend and learn from national partners was also cited as important to stay up to date with current evidence and changes in national priorities.

We participate on national calls ...so we would frequently stay up to date on changing evidence and changing policy that came out of CDC. We're literally looking at, if you will, what's being put out on that national agenda and that national stage at that time

### **Foster an environment of trust**

Working in an environment in which leadership encouraged internal staff and external partners trust one another and the overall process of implementation was described by respondents as important for preventing mis-implementation.

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## **Political leadership**

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The ability for leadership to navigate political influences was another critical aspect of preventing mis-implementation. The Public Health Leadership Competency Framework outlines several key

competencies as part of political leadership that aligned with our findings: advocate and participate in public health policy initiatives; understand and apply effective techniques for working with boards and governance structures; building alliances, partnerships and coalitions regarding critical issues; and evaluate and determine the appropriate actions regarding critical political issues.

### **Advocate and participate in public health policy initiatives**

Several competencies, specifically interpersonal skills, the ability to build partnerships and connect with and understand partners and a strategic approach, were cited as important in preventing mis-implementation. Interpersonal skills include the ability to influence other's thinking and behaviors, even in the absence of formal authority. Respondents perceived a leader with strong interpersonal skills to positively influence policy proposals and improvements in specific areas of programs or changes in the target population.

I think it really takes diligent and observant program directors,... and if they're evaluating their program, and who they're targeting and reaching. I think it would take those types of people to go to the decision maker and say, I think that this program isn't as effective—we could try to reach a different population in a different way.

### **Understand and apply effective techniques for working with boards and governance structures**

The ability to think about the dynamics among stakeholders within a social system is one of the competencies that help leadership navigate different political situations. Some respondents shared some examples that represent the importance of assessing and responding to the political environment, using effective techniques with a variety of decision-makers and governing structures. When doing so, leadership should consider the impact of those dynamics on programs and how they will respond to address potential issues.



We did try to have different perspectives from the different parties that were engaged in the work to determine what that best approach would be.

### **Building alliances, partnerships and coalitions regarding critical issues**

Building alignments and alliances seem to be an essential attribute when dealing with the challenges of mis-implementation, especially within those programs that require political support. When facing challenges to address specific health-related topics or reaching out to target audiences of a program, the respondents reported strategies employed by leadership to engage their partners to potentially impact the program success and continuation.

We can work with heart, lung and cancer that can work with legislators and propose legislation but we would be limited in the fact of never being able to publicly print out our support of that. But it doesn't stop us from working with those who can advocate.

### **Evaluate and determine appropriate actions regarding critical political issues**

A common thing mentioned by the respondents in terms of program mis-implementation was the importance of leadership having a clear vision and purpose of their work with a strategic approach to establish the needs and direction of a program and communicate that approach to policymakers.

I think that particular program, we had a change in the leadership and oversight, and then the person that started is very focused on scalability, sustainability, and outcomes, and the program clearly had no outcomes. She was able to really gain a support of the bureau chief to kind of identify that as an issue, and they were able to shut that down.

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## **Discussion**

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This paper identifies the competencies of leadership in preventing the mis-implementation of chronic disease programs. Using qualitative interviewing and thematic analysis, we identified five

main leadership competences outlined by the Public Health Leadership Competency Framework [13] that affect mis-implementation: '1. leadership and communication; 2 collaborative leadership; 3. leadership to adapt programs; 4. leadership and organizational learning and development; and 5. political leadership'.

Other research, conducted both about public health departments and among other organizations, has identified similar outcomes. Similar to our findings, studies have also shown that transparency and bidirectional communication enhance employee commitment [18, 19]. Employees' 'upward voice', self-efficacy and high work satisfaction, which is a by-product of bidirectional communication, has also been linked to leadership engagement [19, 20]. Regarding collaborative leadership, the National Public Health Leadership Institute notes the importance of collaborative leaders to address public health problems. The Institute notes that leaders who employ collaborative competencies strengthen interorganizational relationships, coalitions, services, programs and policies and are key to a program's overall impact [21]. Other studies have also noted the importance of evaluation and adapting public health programs based on evaluation outcomes. Jadhav *et al.* (2015) discuss the importance of using quality improvement processes in SHD to ensure program success [21, 22]. In a review of quality improvement process in chronic disease programs, Wagner *et al.* note that leaders who understand the importance of quality improvement are more likely to show commitment to the program by securing resources for conducting evaluation and using results. They note rapid turnover in leadership and leaders that encourage productivity rather than quality as barriers to continuing effective programs [23].

A positive working environment and culture which encourage staff collaboration and learning have also been shown to be strongly associated with strong leaders and effective implementation of evidence-based public health [10, 24]. An international research study that tested the effect of transformational leadership and organizational climate on work performance during the

coronavirus disease 2019 (COVID-19) pandemic found such competencies especially important during times of stress to the public health system [25].

Political leadership is another essential competency of leaders outlined in the literature. Organizations can be considered as political arenas [6], and individuals with political skills [26] or political astuteness [27] may influence people's behavior, performance and effectiveness of an organization and within it [28].

Ours is the first study to identify the qualities and roles of leaders in affecting mis-implementation of chronic disease programs. Future research is needed in this area to further understand mis-implementation and the role of leadership in preventing mis-implementation over time. While our use of qualitative methods provided depth and content into the issue of mis-implementation, future research should incorporate a mixed-methods approach to more comprehensively understand the relationships of leadership and mis-implementation.

### Limitations

As noted in our methods, our respondents were determined based on responses to our phase one national survey. That survey did not receive equal responses among the states, and its recruitment was only as good as the contact information study team members had access to. Therefore, our criteria for state selection for these interviews were limited. We also had two states that requested that we either not contact their staff or did not respond to our initial requests for interviews. Therefore, these responses are limited in their generalizability.

In addition, 22% of the respondent identified as directors—generally seen as leaders in SHDs and their views related to the items studied might be influenced by their role as leaders. While the majority of respondents were program coordinators, their views could also be biased, depending on the size of the SHD and their role. Further research should examine frontline staff opinions on important qualities of leaders.

Given the delicate, political nature that public health funding and administration has become, respondents were at times self-censuring in their feedback. Despite following appropriate IRB protocols and reassuring respondents that their responses would remain confidential and states, names and programs would remain as de-identified as possible, often respondents asked to redact certain information during the interview for fear of it appearing to favor certain political officials over others and to downplay any appearance of 'advocating or lobbying' on their part (which in many states has major restrictions). Despite these limitations in responses, the team was able to garner unique insights into how leadership dynamics affect the way evidence-based public health can be successful.

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### Conclusion

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Increased attention on reducing mis-implementation in public health practice can lead to more effective and efficient use of limited resources [10]. Results from this study showed the close interrelationship between mis-implementation and leadership. Using the Public Health Leadership Competency Framework [13], we found that five main leadership competences can influence mis-implementation: leadership and communication; collaborative leadership; leadership to adapt programs; leadership and organizational learning and development and political leadership. A better understanding of those attributes can provide further direction to future areas of attention and capacity building among current and future public health practitioners and development of public health leader training programs and curricula [29, 30].

### Implications for public health practice

This paper provides insights into the tasks and roles of leaders and adds specific information about the attributes of public health leadership when focusing on preventing the mis-implementation of public health programs. A better understanding of those attributes can provide further direction to future

areas of attention and capacity building among current and future public health practitioners.

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### **Contributions to the literature**

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- This is the first study to document the relationship between leadership and mis-implementation of public health programs.
  - This paper outlines the effective qualities of leaders for maximizing limited resources and delivering effective programs to enhance population-level health outcomes.
  - Results from this study provide further direction to future areas of attention and capacity building for public health leadership.
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### **Conflict of interest statement**

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None declared.

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### **Authors' contributions**

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S.M.R. guided study design and interview guide development, conducted interviews, coded interview transcripts, analyzed and interpreted interview themes and led and contributed to writing the manuscript. M.P. managed the development of the interview guide, conducted interviews, coded interview transcripts, analyzed and interpreted interview themes and was a contributor in writing the manuscript. L.S. analyzed and interpreted interview themes and was a major contributor in writing the manuscript. R.S. coded interview transcripts, analyzed and interpreted interview themes and contributed to writing the manuscript. E.R.W. helped with interview guide development, conducted interviews, analyzed and interpreted interview themes and contributed to writing the manuscript. R.B. guided study design and interview guide development and contributed to writing the manuscript. All authors read and approved the final manuscript.

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### **Ethics approval and consent to participate**

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Ethical approval for this study was provided by the Washington University in St Louis Institutional Review Board (IRB# 20812062). All participants were emailed a copy of the consent form prior to

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interviews, and verbal consent was obtained from participants.

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### Consent for publication

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Consent was obtained from participants to use the interviews as part of publications. This is included in our Washington University in St Louis Institutional Review Board (IRB# 201812062) approved consent form.

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### Availability of data and materials

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The datasets generated and/or analyzed during the current study are not publicly available due to privacy protections but are available from the corresponding author on reasonable request.

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