

Leadership Principles for Developing a Statewide Public Health and Clinical Laboratory System

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SYNOPSIS

In 1999, the Centers for Disease Control and Prevention (CDC), the Association of Public Health Laboratories (APHL), and the Federal Bureau of Investigation established the national Laboratory Response Network (LRN) for bioterrorism readiness. A more broad application of the LRN is the National Laboratory System (NLS), an effort to promote the 10 Essential Public Health Services and the Core Functions and Capabilities of State Public Health Laboratories (hereafter, Core Functions). State public health laboratories (PHLs) are responsible for leading the development of both the LRN and the NLS in their jurisdictions. Based on the experience of creating a laboratory network in Wisconsin, leadership principles are provided for developing and strengthening statewide laboratory networks of PHLs and clinical laboratories, which can also include point-of-care testing sites. Each state PHL, in the context of these Core Functions and leadership principles, sets its priorities, budgets, and strategic plans. For a limited investment of personnel and funds that will yield a large benefit to public health, a robust state laboratory system can be established.

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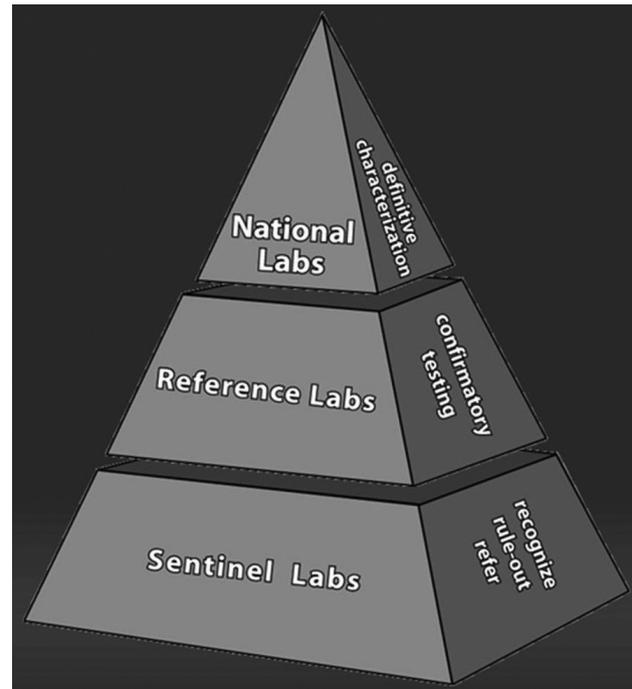
In 1999, the Centers for Disease Control and Prevention (CDC), in partnership with the Association of Public Health Laboratories (APHL) and the Federal Bureau of Investigation, established the framework for a national Laboratory Response Network (LRN), whose objective would be to ensure an effective laboratory response to bioterrorism by helping to improve the nation's public health laboratory (PHL) infrastructure.¹

The LRN framework for biological terrorism is currently visualized as a pyramid with three organizational tiers (Figure 1). At the apex of the pyramid are several federal governmental laboratories, such as those found at CDC and within the U.S. military system. These national laboratories employ scientists who are specially trained to work with highly infectious agents in high-containment facilities. The second tier consists of more than 150 state PHLs and other governmental laboratories with advanced skills that qualify them to be reference laboratories. These reference laboratories are capable of agent isolation and diagnostic testing, as well as rapid detection using sophisticated molecular testing protocols. The third tier, which is at the foundation of the pyramid, consists of more than 25,000 private and commercial laboratories nationwide that serve as sentinels to the system. The majority of the sentinel laboratories are independent and hospital laboratories that participate in the day-to-day health of their local communities, putting them in an ideal position to act as the early warning system for emerging health issues.²

As state laboratories proceeded to implement this new CDC directive, it became apparent in Wisconsin that not only was it necessary to enhance and expand existing relationships with clinical laboratories, but relationships also needed to be developed with those entities that relied on laboratory services, data, and expertise. Without this full array of partners, it would not be possible to identify man-made or naturally occurring health threats and initiate effective and timely responses.³

With increased use of rapid point-of-care waived diagnostic kits in physicians' offices, non-laboratory staff now perform the work of laboratory technologists. There is a need to extend laboratory networks to include the more than 200,000 physician offices in the United States, as these testing sites are rapidly becoming a main source of surveillance data and microbial isolates for state PHLs. In Wisconsin, these physician offices also rely on training and surveillance data provided by the Wisconsin State Laboratory of Hygiene (WSLH) to help guide their diagnostic and treatment decisions.

Figure 1. Hierarchical organization of the Laboratory Response Network (LRN)

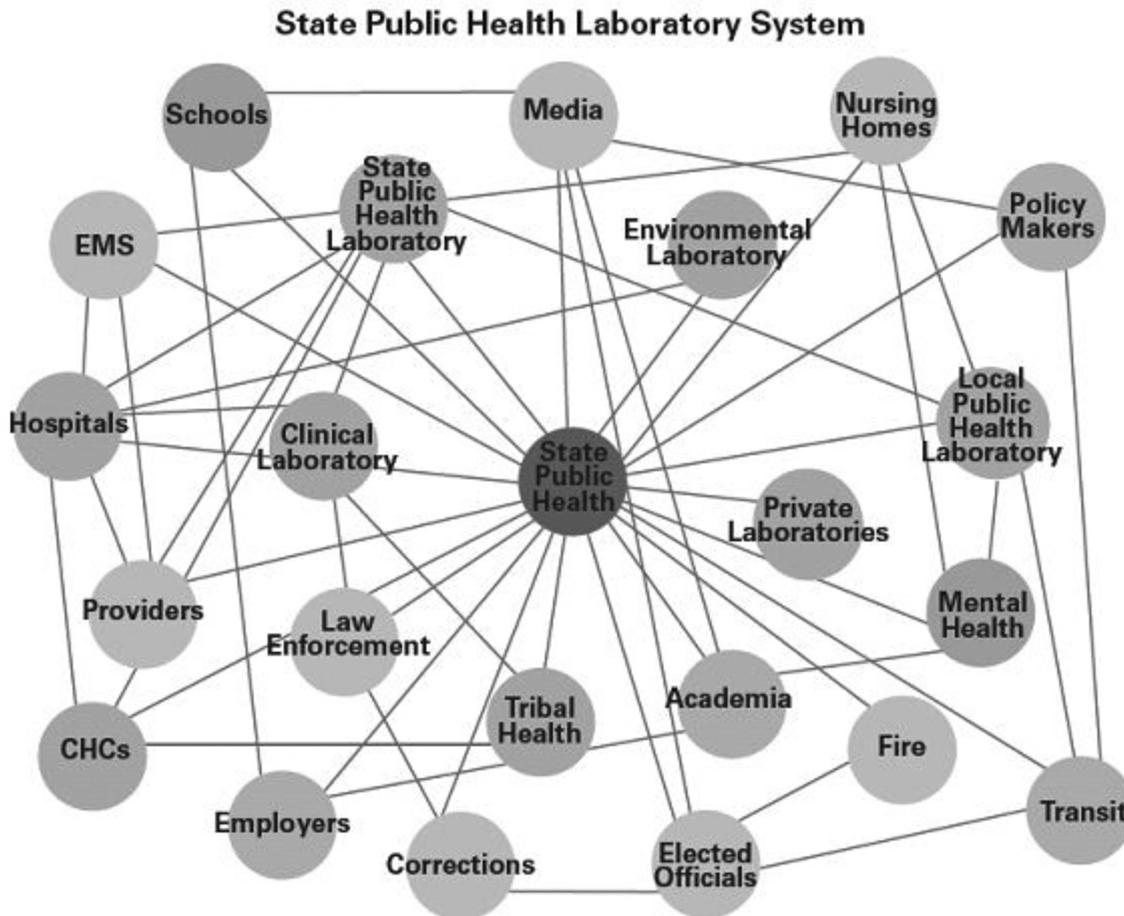


THE NATIONAL LABORATORY SYSTEM

A more broad application of the LRN is the National Laboratory System (NLS). In a collaborative effort to promote the 10 Essential Public Health Services⁴ and the Core Functions and Capabilities of State Public Health Laboratories,⁵ in 2000 CDC and APHL developed the concept of the NLS. The vision of the NLS is to link private-sector, clinical laboratories in the U.S. with public health, veterinary, food safety, and environmental testing laboratories to create seamless systems within each state to enhance public health surveillance, emergency response, laboratory support, and quality improvement⁶⁻¹⁰ (Figure 2). Key objectives of the NLS include assessing and monitoring laboratory capacities, increasing coordination and communication among laboratories, building partnerships between public and private laboratories, developing the laboratory workforce through training and education, and promoting laboratory standards.¹¹

The success of the NLS depends on the creation of fully integrated and coordinated laboratory networks in every state, managed and coordinated by the state PHL. Using special collaboration projects, CDC and APHL are attempting to improve system capabilities to collect and share surveillance data and to standardize

Figure 2. State Public Health Laboratory System partners as depicted in the APHL State Public Health Laboratory System: Performance Standards User's Guide^a



^aAssociation of Public Health Laboratories, Laboratory Systems and Standards Subcommittee. State public health laboratory systems: performance standards user's guide. Silver Spring (MD): APHL; June 2007. Also available from: URL: http://www.aphl.org/aphlprograms/lss/projects/performance/Documents/users_guide.pdf [cited 2009 Oct 4].

APHL = Association of Public Health Laboratories

EMS = emergency medical services

CHC = community health center

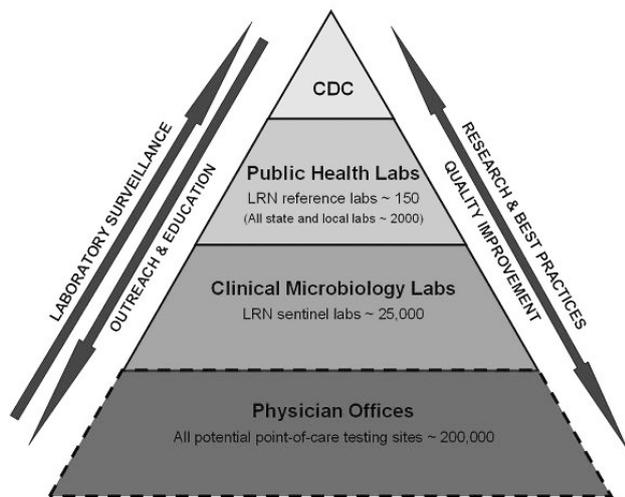
practices for state networks. By providing training and outreach, and through improved surveillance networks, a two-way exchange occurs that incorporates best practices and public health-related research opportunities. Network interaction results in quality improvement at all system levels (Figure 3). However, coordinating a collaborative network of laboratory partners is not an easy task. Although every state has different needs, resources, and organizational structures, the principles of collaboration remain the same.

THE WISCONSIN CLINICAL LABORATORIES INTEGRATION PROJECT

Each state PHL operates within the parameters of its mission and the boundaries of its jurisdiction. Most PHLs are not distinct entities, but exist within the organizational hierarchy of the state's public health department. The role, structure, and even funding of the PHLs vary widely.

In 2006, the WSLH was awarded a three-year NLS cooperative agreement from CDC as part of a federal initiative to integrate clinical laboratories into public health testing. Wisconsin is one of several states that

Figure 3. The expansion of the LRN concept to an NLS concept, including point-of-care testing in physician offices



LRN = Laboratory Response Network
 NLS = National Laboratory System
 CDC = Centers for Disease Control and Prevention

have successfully developed a robust clinical laboratory network that addresses both emergency preparedness and routine microbiology issues. In the last two decades, the WSLH has provided training resources, regional meetings, and teleconferences that benefit both local public health departments and private laboratories statewide. The laboratory surveillance conducted by the WSLH, a collaborative effort with the Wisconsin Division of Public Health, has also resulted in quality public health data that impact state and local public health policy decisions.

The first grant deliverable was the *Guide to Developing Laboratory Networks*, from which other state PHLs may benefit from some examples of Wisconsin's successes and failures. This guide defines the steps used by WSLH to build a statewide laboratory network of public health and private-sector microbiology laboratories.¹² While developing this guide, two primary factors became apparent to the success of networks. The first was the support of the state PHL's administrators and the many clinical laboratory decision makers. Results from a recent survey of all Wisconsin Clinical Laboratory Network (WCLN) administrators revealed that while many were not directly involved in the network's operations, nearly all recommended similar networks to colleagues in other states (data on file at WSLH). The key to this finding is that hospital administrators do understand the benefits of such a network enough

to support (or at least to not prohibit) their laboratory's involvement.

The second factor was the support and involvement of the laboratory network participants. Time and again, WSLH staff were amazed at the time and effort that private clinical laboratory directors and managers put into the network. From presenting at statewide workshops and teleconferences to defining and steering the network itself as part of the network advisory committee, these participants clearly saw the network's mutual benefits at all levels. The network members benefit from increased education, communication, and collaboration among colleagues, and improved laboratory surveillance that, overall, can result in faster identification of outbreaks and better patient outcomes.

In focus group meetings of WCLN participants, the network staff asked for member stories about their experiences with the network, both good and bad. Members were asked about the perceived effects of the network on both staff and patients, their understanding of the purpose and operation of the network, and what potential future roles were possible for the network in terms of advocacy, data sharing, new testing techniques, workforce development, and cost efficiencies. This focus group resulted in an introductory video segment that briefly summarizes the WCLN experience. The video was provided as a second deliverable distributed to all state PHL directors via APHL, with the networking guide and materials as a networking "tool kit."¹³ This article represents a third deliverable—a publication on collaborative principles needed to develop and sustain a successful laboratory network.

COLLABORATION REQUIRES DELIBERATE ACTION

Often when networks are developed, they are done so without considering the theoretical underpinnings of collaboration. Most just forge ahead without understanding the theory behind network and partnership building, as was the case in Wisconsin. Upon reflection, a study of this theory has offered us an opportunity to reevaluate and strengthen our existing partnerships.

There are two basic organizational models in society: a dominator model, which emphasizes authoritarian (vertical) relationships, and a partnership model emphasizing collaboration (horizontal).¹⁴ While both approaches have existed for a very long time, the application of network models in the health sector is now receiving serious and, some would say, overdue attention. As a 2000 Institute of Medicine report stated, "Government public health agencies, as the backbone

of the public health system, are clearly in need of support and resources, but they cannot work alone. They must build and maintain partnerships with other organizations and sectors of society, working closely with communities and community-based organizations, the health care delivery system, academia, business, and the media.”¹⁵

Collaboration is by no means a new idea, but public health professionals are significantly more familiar, and maybe even more comfortable, working within single institutions rather than in competitive environments or markets. To build partnerships, it is helpful to understand them as cross-cultural exercises—requiring competence to navigate the differences among multiple organizations and sectors with significantly different missions, management structures, and sources of funding.

The successful development and maintenance of a laboratory network fundamentally depends on strong network leadership. Developing and supporting a statewide laboratory network with voluntary participants involves a different set of skills than those used in managing an agency or institute. Even within a single state such as Wisconsin, system concepts are viewed from many different perspectives. A major difference is one observed repeatedly: government public health agencies will use the phrase “public health system” broadly, to include many entities outside of the public sector (Figure 2). At the same time, private entities rarely think of themselves as part of the public health system. This perception is not a trivial barrier to developing a common mission for a network.

While state laboratories have been reaching out to establish or strengthen statewide networks, clinical laboratories have been receptive to collaboration. Recognition of the roles played by federal and state agencies and public and private laboratories in meeting the challenges of such emergencies as Hurricane Katrina and *Escherichia coli* contamination of spinach helps to foster such collaboration. De Pree, in *Leadership Is an Art*, offers an approach based on his experience that aggregate corporate productivity is increased to a maximum by working in collaboration with individual work sites and employees.¹⁶ De Pree’s eight leadership principles are outlined in this article as a suggested platform in the context of developing and strengthening statewide laboratory networks (Figure 4). Operational transparency, mutual involvement, mutual benefit, and a clear understanding of the network’s vision and mission are essential. As these principles are put into practice, a number of questions (Figure 5) must also be addressed.^{17–19} For example: Are the network

operational rules clearly defined? And how formal or informal will the operational rules be?

CONCLUSIONS

The benefits of the NLS include improved surveillance activities, more rapid and focused responses to public health emergencies, and a more informed and connected health-care community. Many of the barriers to fully implementing such a system remain within the state PHLs. The responsibility to lead the development and management of a robust statewide laboratory network is implied, if not implicit, within the Core Functions.⁵ Among the Core Functions that directly relate to the benefits offered by networks with clinical laboratories are emergency response; partnerships and communication; reference and specialized testing; disease prevention, control, and surveillance; training and education; and laboratory improvement and regulation. Most of the remaining Core Functions can also be indirectly impacted from the activities of laboratory networks, such as public health-related research, integrated data management, food safety, and policy development.

Each state PHL, in the context of these Core Functions, must set its priorities and strategic plans. For a limited investment of personnel and funds that will yield a large benefit to clinical laboratories and PHLs, and the overall public health system, a state laboratory network can be established.

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Figure 4. Eight leadership principles^a as a guide for developing collaborative laboratory networks

Networking principle	Description
There is mutual trust.	Develop relationships based primarily on mutual trust so that the cooperative goes beyond the minimum performance inherent in written agreements. The director of a laboratory has some authority to hire and fire staff and approve budgets and work plans; i.e., he or she has, at least in theory, some control of the organization. However, the development and maintenance of a laboratory network cannot be based on traditional control mechanisms, as local laboratories are voluntary participants. While a buyer needs to trust a seller, the level of trust within an effective network must go much deeper if it is to have the stability necessary for long-term success. Like any relationship, the relationship between the state laboratory and local laboratories within the network must be built on trust and earned over time. To paraphrase Susan Scott in <i>Fierce Conversations</i> : "The relationship is the network. Networks succeed or fail, one relationship, one encounter, at a time." ^b
Commitment makes sense.	Participants may join a network to explore its potential; they remain only if it makes sense for them to do so. In any business—nonprofit, for profit, public, or private—for a significant activity to be sustained, there must be a positive return on investment (ROI) of the resources (money and time) to participate. Potential participants in a statewide laboratory network may investigate on a trial basis, but they will only engage over the long haul if they gain more by being in the network than by staying out of it. This is true for the state laboratory and for individual local laboratories. Not every network activity must benefit every laboratory every time, but the aggregate ROI must be positive for a participant to continue.
Participants are needed.	Each laboratory must know that it is needed for the success of the network. As noted previously, managing a network is all about managing relationships. As in our family and social networks, a healthy relationship cannot exist where one party does all the giving and the other all the receiving. For a state laboratory network to be healthy, its participants must have a clear sense of what they are contributing to the good of the overall network.
All are involved in planning.	The planning is interactive, with the plan for the laboratory network being the result of, and feeding into, the plans of the state and local laboratories. A centrally planned and executed set of laboratory services may be very rational, but it does not describe a network; it is closer to what economists call an oligopoly—a market or industry that is dominated by a small number of sellers. A network is characterized by a planning process that includes real input from all of the participants, not just the state laboratory. There must be an ongoing process that incorporates an active role for all participants for the enterprise to be a network.
Big picture is understood.	Participants need to know where the organization is headed and where they are going within the organization. Transparency in the motivation behind current and future proposals to the network is a necessary foundation for the development and maintenance of trust among the participants. All must know about and agree with the long-term vision if that vision is to have a chance of becoming a reality.
Participants affect their own future.	The desire for local autonomy needs to be made to work for the network through the promotion of collaborative solutions that enhance self-interest. Network leadership needs to balance the success of the whole with that of each local laboratory's own priorities. Few networks have gotten very far asking individual participants to take a "hit" for the greater good. In other words, network leaders need to balance the need to develop a group identity with the practical reality of rewarding individual behaviors.
Put accountability up front.	Participants must always know up front what the rules are and what is expected of them. A contract or a letter of agreement is not primarily to provide a local or state laboratory with "legal" protection. Perhaps in this case, the model isn't quite the same as a prenuptial agreement, but it is a critically important mechanism to increase the likelihood that all laboratories participating in the network think through in advance what is expected of them, both in terms of benefit and cost.
Decisions can be appealed.	A clear, nonthreatening appeal mechanism is needed to ensure individual rights against arbitrary actions. A key element of maintaining the "rights" of the individual in balance with the good of the network is a clear mechanism to work out differences or conflicts that could develop between an individual laboratory and the network or state laboratory. The degree to which such a mechanism is called upon is obviously lessened if expectations are clear on the front end, as noted previously.

^aSource: De Pree M. Leadership is an art. East Lansing (MI): Michigan State University Press; 1987.

^bScott S. Fierce conversations: achieving success at work and in life, one conversation at a time. New York: Penguin Putnam Inc.; 2002.

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Figure 5. Questions to consider as a statewide laboratory network is being constructed

Question	Explanation
1. How does the network manage members joining and leaving?	As networks are very dependent upon individuals and corporate relationships, it is important to attend to the coming and going of all participants. New members need to be well oriented into the network operations, and honoring the contribution of those leaving is important to maintaining group cohesion and trust. In addition, to the degree that relationships among the participating organizations are at various levels in each of the participating organizations, the network itself is less vulnerable to a single individual's departure.
2. How are roles established?	Formal networks should be treated like any other organization; if the network is incorporated, its bylaws should address many of the "who does what, when, and how" questions. If the network is less formal, there should at least be an explicit written understanding of each participant's responsibilities. Even within the network, if services are being sold from one participant to another, there should always be a signed contract or service agreement so that the expectations each party has are thought about in advance.
3. How does the network share risks and rewards?	In general, we expect rewards to follow and be proportional to risk; the more risk a participant has, the more control they will seek. For incorporated networks, risks and rewards can reside within the network and remain there (e.g., nonprofit organization), be allocated on the basis of patronage (e.g., traditional cooperative), or be based on financial "interests" (e.g., Limited Liability Corporation). When the network is not incorporated, risks and rewards typically follow normal expectations among buyers and sellers, albeit ones intent on maintaining a long-term relationship.
4. How does the network measure outcomes?	<p>The amount of effort put into evaluating a network's outcomes is obviously dependent on its size, complexity, and maturity, and is dependent upon a strategic plan and set of objectives (i.e., you can't know whether you hit or missed the target if you haven't agreed on where you are aiming). Each major objective should be in a written work plan and should be evaluated at least quarterly to see if work has "been completed," is "on schedule," is "behind," or in some cases should be "deleted" as no longer relevant. Balanced scorecards have become increasingly popular mechanisms for network staff and boards to track and help drive performance improvement. Metrics specific to the network's purpose are selected, targets are assigned, and performance is reported quarterly. They are typically organized into a hierarchy of four quadrants, each building on the one below it:</p> <ul style="list-style-type: none"> • Financial/Business (What must we do to achieve our vision?) • Customer (What must we do for our customer?) • Internal (How will we do it, where is the internal focus?) • Investment (What investments, learning, and growth must occur?)
5. How does the network "handle" participants who do not fulfill their roles?	First and above all, to reduce the chance of a participant not fulfilling his or her role, all participants must be clear about what is expected of them; this is true in terms of any role on governing boards or advisory committees, as well as in the context of buying or selling services. Secondly, there must be mechanisms for feedback so that individual participants can know how they are doing. The network's bylaws or operating agreement as well as any shared service contracts should then be explicit in terms of what happens when agreed-to responsibilities are not met. In addition, there should be a clear "appeals" mechanism (e.g., in many networks this would be to an executive committee or a group representative of network participants).
6. How frequently do partners need to meet?	In practice, there is a fair amount of diversity on this issue; networks whose partners are more involved in network operations, or who use the meetings as a regular means to share information and ideas with each other, meet more often. Networks meeting once a month or once a quarter could be described as active; networks meeting less often would probably best be described as primarily fulfilling an advisory or passive role.
7. How formal does the partnership charter need to be?	If a partnership itself is to do real work, it needs to have a degree of formality comparable to the complexity of what it wants to accomplish. If it is intended only to be the occasional convening of customers with similar interests, little formality beyond that inherent in a sales agreement or service contract is required. If the network is expected to do real work, it is also important that expectations as described previously be agreed to and recorded, whether or not the network is incorporated. The more complex the network's activities become, the more likely it is that incorporation may be worth the trouble.
8. What are the signs of a healthy partnership?	A healthy partnership is one seen by its participants as meeting their needs as outlined in the network's strategic vision and objectives, and as measured through an ongoing process of self-evaluation.
9. How do you treat symptoms of an unhealthy partnership?	Depending on the severity of the symptoms and complexity of the network, interventions may include (1) network participants or staff taking a "needs watching" attitude toward the symptoms to determine whether or not they constitute a self-correcting "speed bump," which any group hits from time to time; (2) an explicit discussion among the participants to determine alternative interventions; (3) bringing in an outside consultant; or (4) reconfiguring or disbanding the network.

continued on p. 117

Figure 5 (continued). Questions to consider as a statewide laboratory network is being constructed

Question	Explanation
10. What are the personal attributes of a collaborative leader?	<p>Cooperation needs to be a core competency when recruiting staff leadership for any laboratory network. Personal attributes include the experience or potential for leading collaborative enterprises or networks; cultural competence across diverse communities and populations; the appreciation for the dualities inherent in American culture—for example, individualism and community, or competition and collaboration; a realistic understanding of the health system challenges we face balanced by an “irrational” optimism and faith that we each can make a difference; and a vision that leadership needs to be simultaneously top down and bottom up.</p> <p>Following is a set of general questions intended to stimulate conversation regarding an individual’s potential to manage a network:</p> <ul style="list-style-type: none"> • What is the role of “trust” in your work with colleagues or partners? • What examples can you offer of your ability to develop trust in these partnerships? • How did you do it? • How was the relationship affected? • How have you been able to make your collaborative partners feel useful? • In what ways have you worked to promote collaborative solutions that have enhanced the self-interest of all participants?

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