All Kids Count Connections: A Community of Practice on Integrating Child Health Information Systems

Ellen L. Wild, Patricia A. Richmond, Louis de Merode, and John D. Smith

Integrated child health information systems consolidate data about multiple health care services a child receives into information useful to families, private health care providers, public health officials, and others. The challenges to successful integration faced by public health agencies are similar, yet system integration projects have historically struggled in isolation to overcome these barriers. All Kids Count created a community of practice called Connections to bring together 11 state and local public health agencies engaged in child health information system integration projects to learn from each other, capture best practices, and collaboratively address challenges. As demonstrated by All Kids Count Connections, communities of practice can be employed by geographically distributed public health agencies to address complex issues.

KEY WORDS: child, communities of practice, diffusion of innovation, information dissemination, information systems, knowledge management, public health informatics, systems integration

Integrated child health information systems consolidate data about multiple health care services a child receives into information useful to families, public and private health care providers, public health agencies, and others (eg, schools, social service agencies, and the Women, Infants and Children [WIC] program). Once established, integrated child health information systems can provide public health agencies with population-based data, health care providers with aggregate data and data about individual children in their practices; and parents with information about their children.

However, there are many obstacles impeding the planning, development, and implementation of integrated child health information systems by local, state, and federal agencies and the health care industry. Historically, funding for state and local public health departments to develop child health information systems has been program and disease specific, resulting in organizational silos, and separate systems that are frequently incompatible with other information systems. Few agencies and organizations built integrated systems from the outset; therefore, many are now faced with the considerable challenge of linking disparate pre-existing systems. Additionally, while there are numerous information technology solutions available, there are few standards to guide development and electronic linkages. At a fundamental level, the difficulties that result from this pattern are organizational, managerial, and technical.

Finally, agencies working without benefit of adequate peer and stakeholder input have been left with systems that their stakeholders could not use, or they have "reinvented the wheel" by duplicating technologies that were already developed elsewhere. Often, public health program managers and information technology specialists—including commercial technology vendors—have been unable to communicate effectively, resulting in wasted resources and insufficient solutions.

In general, there is a lack of coordination among and learning across public health agencies, public and private health care providers, information technology

Corresponding author: Ellen L. Wild, MPH, All Kids Count, Task Force for Child Survival and Development, Public Health Informatics Institute, 750 Commerce Drive, Suite 400, Decatur, GA 30030 (e-mail: ewild@phii.org).

Ellen L. Wild, MPH, is Director of Programs, All Kids Count, Public Health Informatics Institute, Task Force for Child Survival and Development, Decatur, Georgia.

Patricia A. Richmond, BA, is Program Associate, All Kids Count, Public Health Informatics Institute, Task Force for Child Survival and Development, Decatur, Georgia.

Louis de Merode, MS, MA, is Principal Consultant, Silver Creek Associates, Alexandria, Virginia.

John D. Smith, MArch, is Principal, Learning Alliances, Portland, Oregon.

J Public Health Management Practice, 2004, November(Suppl), S61–S65
© 2004 Lippincott Williams & Wilkins, Inc.

> To develop shared solutions, issue-specific partnerships are critical to advance the development, implementation, and sustainability of integrated child health information systems.

professionals, and community stakeholders creating an overall lack of efficiency. To develop shared solutions, issue-specific partnerships are critical to advance the development, implementation, and sustainability of integrated child health information systems.

All Kids Count Response

Throughout its 12 year history, All Kids Count, a Robert Wood Johnson Foundation (RWJF) funded program, has approached technical assistance to public health practitioners by providing forums for its grantees and others to come together and learn from one another, and to study, understand, and find solutions collaboratively on specific issues related to the development of information systems. From 1992–2000, All Kids Count focused on the development of immunization registries. RWJF provided grants ranging from $300,000–$500,000 to state and local public health agencies developing immunization registries. As a National Program Office for the RWJF, All Kids Count provided technical assistance to its grantees. In 2000, All Kids Count was funded by RWJF as a National Technical Assistance and Resource Center for integrating early child health information systems. In this role, All Kids Count worked with federal agencies, state and local public health departments, national associations, and the private health care industry to define a vision for integrating child health information systems.

Recognizing the challenges that state and local health departments face in developing integrated child health information systems, along with the belief that the vision for these systems must come from those in the field to ensure its appropriateness, All Kids Count created Connections. Connections brought together state and local health agencies engaged in planning, developing, and implementing integrated child health information systems, to learn from each other, capture best practices, and work collaboratively on specific integration challenges. Connections also provided All Kids Count access to public health leaders, program staff, and information technology professionals who were working on integrated information systems, which helped ensure that All Kids Count's activities were practical, useful, and appropriate.

When Connections was first created, the term "communities of practice" was unknown to All Kids Count. Through literature research, All Kids Count found the term appropriate to its intended strategy, past and current, and began to strategically apply the communities of practice approach to Connections.

Communities of Practice

Cultivating communities of practice is a knowledge management strategy that has been used in industry,[1] government,[2] and education[3] to support collaborative problem solving and innovation around complex issues or concerns. A community of practice's interactions may be entirely face-to-face or virtual or a combination of in-person meetings, video- and teleconferencing, and a variety of electronic communication technologies used to "increase the sharing of lessons learned, the exchange of insights and ideas, and the transfer of expertise and hands-on experience."[4(p2)] Community members work together to create specific documents or other tools to advance their professional practice and the practice of others in their field of expertise. While not a new concept by any means, with examples of similar professional learning networks seen as far back as the Middle Ages,[1] today, communities of practice are increasingly valued in many sectors for their contribution to peer-to-peer learning, capturing and documenting knowledge, and fostering innovation.

Connections

The intent of Connections was to bring together a diverse group of practitioners as a community of practice, although the term was not initially used, so that those in the planning phase would benefit from the experience of more advanced projects, and the more advanced projects would learn from each other. Connections began with 9 state and local health agencies and expanded to include 11 agencies over the course of 3 years (see Box 1). Each of the member agencies was engaged in either planning, developing, or implementing the integration of 2 or more child health information systems.

Along with these state and local health agencies, representatives from federal agencies also participated in Connections as ad-hoc members. The Genetic Services Branch of the Health Resource Services Administration, the National Immunization Program of the Centers for Disease Control and Prevention, and the National Health Information Infrastructure Initiative of the Department of Health and Human Services were represented at several Connections meetings. Information technology consultants working with some of the members also participated in Connections on a regular basis.

BOX 1 ● **Connections members**

- CalOptima
- Iowa Department of Public Health
- Kansas Integrated Public Health System
- Michigan Department of Community Health
- Maine Bureau of Health
- Missouri Department of Health and Senior Services
- New York City Department of Health and Mental Hygiene
- Oregon Department of Human Services
- Rhode Island Department of Health
- Santa Clara County Public Health Department
- Utah Department of Health

At the launching of Connections, members agreed to have frequent face-to-face meetings, following a site visit format and rotating the location of the meetings among the member sites. Members wanted the opportunity to comprehensively review each other's integration projects. The site visits were 2.5-day meetings with half of the agenda devoted to a detailed orientation to the host's integration project, and the other half focused on collaborative Connections activities. Social events were carefully planned to facilitate informal conversations between members. Over the course of 3 plus years, the members met 7 times and had 5 site visits. All Kids Count paid for 2 members from each member site to travel to meetings. Between meetings, Connections members came together through teleconference calls, a list-serve and an interactive Web site called ConnectionsZone, which provided for threaded discussions, document sharing, and chat.

All Kids Count captured and integrated best practices, challenges, and solutions gleaned from the conference calls, ConnectionsZone, and the list-serve, disseminating the results within the Connections community. A newsletter summarizing the meeting was written after each Connections site visit, and CDs compiling the meeting presentations were circulated along with the newsletters.

Connections members also participated in "special projects" focused on specific integration issues. Members were given the opportunity to apply for technical assistance support of up to $50,000 to work on projects specifically related to the integration of child health information systems. To qualify, projects had to both advance the individual members' integration efforts and contribute to the national knowledge base about information systems integration. Over the course of 3 years, 12 individual projects and 2 group projects were funded. Group projects consisted of at least 3 member sites and were managed by consultants under contract to All Kids Count. Project reports were written and published by All Kids Count in 2 volumes of a document entitled "Creating a Road Map: Sharing Knowledge About Integrating Child Health Information Systems." The newsletter, CDs, and the road map were distributed nationally to organizations and associations with an interest in the development of integrated child health information systems, as well as to other state and local health agencies known to be engaged in the planning, development, or implementation of these information systems. Finally, these documents were placed on a Web site for public access (www.phii.org or www.allkidscount.org).

Evaluation of Connections

In September 2003, All Kids Count contracted with Silver Creek Associates, a firm knowledgeable in community of practice methodology and evaluation, to evaluate Connections. The evaluation was to answer the following 3 questions: (1) Did the members benefit on an individual professional level? (2) Did participating in Connections affect the approach of member organizations in planning and managing information systems? and (3) Did participating in Connections accelerate the development of the members' integrated information systems projects? All Kids Count also wanted to know which activities the members found most valuable and which activities were less valuable. Finally, was Connections, as a community of practice, successful in advancing knowledge of and accelerating the development of integrated child health information systems?

Silver Creek Associates conducted a series of individual and group interviews with Connections members and administered a Web-based survey. The Web-based survey, comprised of 27 questions, was sent to 33 of the Connections members, of which 28 responded. Silver Creek interviewed a total of 26 Connections members, representing all 11 member agencies. They conducted 8 individual and 7 group interviews. In order to gather information from a wide range of perspectives, the interviews included the members who were most involved in the community, as well as those who may have participated only once in a Connections activity.

Analysis of the survey and interviews found that all members participating in the study, without exception, reported gaining substantial, tangible benefits from their participation in Connections—for their integrated child health information systems projects; for their organizations and their capacity to develop and manage integration projects; and for themselves as professionals (see Table 1).

Members felt the community offered a safe haven, where they felt comfortable sharing their failures as

TABLE 1 ● Connections evaluation: top 10 Web-based survey responses

Survey response	Average score (out of 4)
I benefited personally and professionally from my participation in Connections.	3.67
I found it easy to contribute my knowledge and ask my questions in Connections meetings.	3.64
Connections meetings have been an effective way for participants to learn from one another.	3.64
I liked the sense of belonging to a group like Connections where we had common goals and concerns.	3.62
Connections meetings included sufficient occasions for informal unplanned exchanges among participants.	3.58
I am more aware of the scope for improvement in my organization's approach due to the exposure I've had to other agencies in the Connections meetings.	3.56
All Kids Count staff tasks (ie, project initiation, conception, organization, facilitation) were discharged effectively.	3.56
My contribution to the Connections discussions was sufficiently valued and acknowledged.	3.52
All Kids Count staff was effective in managing (creating, obtaining, organizing, and delivering) information resources for Connections participants.	3.48
My child health information integration project has benefited from my involvement in All Kids Count Connections.	3.48

well as their successes and where problems could be explored and innovative solutions reviewed without judgment. Participation in Connections established the practice of community members contacting each other to ask for advice, suggestions, or other information to solve a specific problem. The community culture contained elements of trust, valued relationships, and a commitment to mutual support.

The evaluators found that the diversity of membership was another strength of Connections. Members were located in state, county, and city health agencies and health plan management organizations. Membership included programmatic and technical personnel, as well as consultants and policy staff. The community gave the members a sense of belonging to a group that, though diverse, had common goals and concerns. Members felt their contributions to discussions were sufficiently valued and acknowledged. New knowledge about the application of data quality or data deduplication techniques was generated and applied as a result of the learning that took place in Connections. Many mentioned that participation in Connections increased their motivation. The overall effect of Connections was to deepen their professional commitment to the vision of integration and to inspire them with new possibilities.

Site visits were the most significant beneficial activity of the community, both for meeting hosts as well as for the visitors. Hosting a site visit was often reported to have resulted in a leap forward in development, a greater shared understanding among local stakeholders of their achievements, and of a common vision for the future. Being a participant or guest in the site visit also had rewards. Members noted that listening to the presentations, consulting the materials, asking questions, participating in conversations, following-up by phone or e-mail queries between site visits, and sometimes revisiting a host privately, also produced clear—sometimes spectacular—results and rewards. Members stuck on particular issues found that there were several tested solutions that solved the problem in comparable circumstances. As one Connections member observed, "Learning from those who have been there took half a year off our own effort."

The least effective community activity was ConnectionsZone, the interactive Web site. Although members did not agree in explaining its lack of success, they generally agreed that the technology was not user-friendly, was too difficult to navigate, and was slow and cumbersome. Some of the members believed ConnectionsZone might have worked despite the technology, if All Kids Count staff had been more expert in managing the application. Others believed that ConnectionsZone was doomed to fail despite these factors, observing that the technology was unfamiliar to Connections members, partly as a result of inadequate access to the Internet. Some members argued that using ConnectionsZone as a means of finding solutions to problems did not work because one had to depart from one's daily routine to enter into a discussion online, when simply e-mailing or calling someone directly to ask for advice made more sense.

Members also felt that there was some loss of community energy and momentum between meetings. In the final year of Connections, several member sites collaborated in group projects outside of the face-to-face meetings. Members said they would have welcomed more of this type of collaboration earlier on.

In sum, all participants of the evaluation saw Connections as a success. In the eyes of members and observers, Connections produced results whether in the performance, quality, or development speed of member child health integration systems; in the way vendors are selected or managed; and in the capacity

and motivation of participants to contribute to system development or to managing its environment. Site visits, the main peer-to-peer learning tool, were unanimously valued. Careful cultivation of community relationships also proved to be exceptionally effective in promoting mutual learning. However, at least some participants believe that Connections did not extract the full potential of the community in every respect. The lack of energy between meetings and the failure of ConnectionsZone were most noted in this regard.

Discussion

The Connections experience has been valuable from two perspectives: (1) by meeting the expectations of all its stakeholders at a high level, Connections has demonstrated the feasibility and the value of communities of practice in helping multiple, geographically distributed public health agencies effectively address the complexities of planning, developing, and implementing information systems and (2) Connections has begun the process of accumulating and evaluating an inventory of experiences from which succeeding communities of practice will be able to draw. Successful practices will serve as a basis for adaptation and refinement. The inevitable shortfalls will signal areas where further experimentation is needed. A few such areas are identified below.

Connections was not created on a theoretical model of a community of practice, descriptions of which can be found in literature. The Connections community of practice methodology developed over time. It was highly dependent upon face-to-face meetings and fell short of keeping the community energy alive between meetings. Connections was funded at a level that supported frequent in-person contact. This level of funding will be difficult to replicate in future public health communities, given the budgetary constraints at both the state and federal public health levels. Therefore, further research should be conducted on activities that can sustain the energy of collaboration and communication among members between meetings, for example, offering more user-friendly technology for interactive, threaded discussions. Web seminars, Blogs (a Web log or journal available on the Internet), and other communication media should also be investigated as potential interactive vehicles that can enhance the virtual life of communities of practice.

With limited funding, more emphasis will have to be placed on developing a framework for the community, prior to implementation. Connections had the luxury to change and develop over time. More intentional and systematic communities will be necessary in the future. This requires researching the common issues, challenges and barriers that potential members face, and articulating the focus of the community up-front in an effort to better guide participation.

Threats of bioterrorism and new emerging infectious diseases, the challenges of rapidly advancing technology, and the changing health care environment, all underscore the need to bring public health practitioners together to learn from one another in issue-specific and action-oriented forums other than large national conferences. Public health must partner with agencies with which it has had little or no previous interaction: the private health care world, education, emergency relief agencies, and federal and state law enforcement agencies, etc. Given these new relationships, nomenclature, and technologies, the complexity of a public health practitioners' job will continue to dramatically increase.

There are few existing road maps to guide the development of programs to address these new complex public health challenges. Communities of practice have the ability to link people from different organizations, to connect people within agencies who might otherwise work independently, and to advance the learning curve and collaboratively create road maps for others to follow.[1]

Despite inevitable shortcomings stemming from lack of precedents and, therefore, of prior experience in the field, Connections has demonstrated the power and effectiveness of communities of practice in accelerating the development of complex information systems and the organizational capacity to manage them. Thus, given that public health's need for integrated information systems is expected to increase in the future, there is a compelling case for building on and improving on the Connections model.

REFERENCES

1. Wenger E, McDermott R, Snyder WM. *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Boston, MA: Boston, MA: Harvard Business School Press; 2002, 1–5, 23–24.
2. Burk M. Communities of Practice. Public roads. May/June 2000;63(6). [US Department of Transportation, Federal Highway Administration Web site]. Available at: http://www.tfhrc.gov/pubrds/mayjun00/commprac.htm 4/7/2004. Accessed April 7, 2004.
3. Schlager MS, Fusco J, Schank P. Evolution of an on-line education community of practice. In: Renninger, KA, Shumar W, eds. *Building Virtual Communities: Learning and Change in Cyberspace*. New York: Cambridge University Press; 2002, 129–158.
4. Fontaine MA, Millen DR. *Understanding the Benefits and Impact of Communities of Practice*. Hershey, PA: Idea Group, Inc; 2004.