A Capacity Mapping Approach to Public Health Training Resources

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SYNOPSIS

The capacity mapping approach can be used to identify existing community resources. As part of this approach, inventories are used to provide information for a capacity map. The authors describe the development of two inventories and a capacity map for public health workforce development. For the first inventory, the authors contacted 754 institutions to determine available public health training resources; 191 institutions reported resources, including 126 directly providing distance learning technologies and courses or modules addressing important competency domains. Distance learning technologies included video conferencing facilities (61%) and satellite download facilities (50%). For the second inventory, the authors obtained information on 129 distance-accessible public health training modules. The workforce development capacity map produced from these two inventories revealed substantial resources available for use by individuals or agencies wishing to improve training in public health competencies.

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The Future of Public Health,[1] *The Public Health Workforce: An Agenda for the 21st Century,*[2] the Healthy People 2010 Objectives,[3] and the report of the Taskforce on Public Health Workforce Development[4] have all recognized an unmet need for public health workforce training. The need is daunting, considering the large number of untrained public health workers[5] and the limited federal funding now available for training.

Consider that the tuition for a single MPH student can easily cost $25,000, with additional salary and opportunity costs when the student is provided with work release time from a public health agency. Compare that to recent federal funding for public health training centers (the Health Research and Service Administration's Public Health Training Centers and the Centers for Public Health Preparedness) in fiscal year 2001 of less than $10 million, or enough to educate just 400 MPH students if used for tuition only.

The training resources of individual local and state health agencies are one source of workforce development training to be considered, but the distribution and availability of these resources does not match the greatest needs for them. Common sense, anecdotal examples, and practical experience support the premise that those agencies that serve in economically depressed areas with the greatest competing needs are the most likely to need staff training and the least likely to have the necessary resources.

Capacity mapping, as described here, addresses the mismatch between needs and available resources.[6] In this article, we describe a capacity mapping approach that can be used by local health departments. We discuss the development of two inventories of public health workforce training resources that we used to construct a model public health workforce training capacity map. Finally, we discuss some of the challenges of a capacity mapping approach when applied to public health agencies, given their characteristic financial, legal, and structural constraints.

CAPACITY MAPPING

Capacity mapping is a strategy to find untapped and unrecognized resources for the purpose of rebuilding a community from the inside out. Instead of looking at a community solely from the perspective of its many problems (such as crime, domestic violence, alcoholism, illiteracy, or lead paint), capacity mapping identifies and maps resources available to a community. These include individual capacities, personal income, the potential contributions of labeled people (developmentally delayed, mentally ill, disabled, elderly, and so on), and individual local businesses and organizations.

McKnight and Kretzmann[6] describe three possible types of resources or building blocks with which to construct a capacity map. *Primary* building blocks are assets and capacities located within and under the control of the community. *Secondary* building blocks are assets located within the community but largely controlled by outsiders. Finally, *potential* building blocks are resources originating outside the community and controlled by outsiders. Resource inventories at both the individual and community levels are used to identify the building blocks, which are then used to produce the capacity map.

CAPACITY MAPPING FOR PUBLIC HEALTH WORKFORCE DEVELOPMENT

As part of the Northeast Regional Public Health Training Project (NERPHT), we assessed the training needs of public health agency workers in six Northeastern states and then used capacity mapping to identify training resources matched to these needs.[7] We recognized that, even with federal funding, resources would be insufficient to meet the needs of large numbers of workers. Rather than develop all training programs from scratch, we developed two inventories of practical resources that could be used to train entry- and mid-level public health workers. One was an institutional inventory and the second was an inventory of individual courses. The geographic scope of the inventories was initially limited to resources for public health workers in the Northeast; it was later broadened to include resources for public health nurses nationally. Since the training needs of the professions overlapped substantially, we used the same inventory questionnaires for both and combined the results to construct a capacity map for workforce development.

We described training needs in terms of "competencies," as developed by the Faculty/Agency Forum,[8] a predecessor to the Council on Linkages between Academia and Public Health, and as suggested by the NERPHT advisors and a prior needs assessment for public health nurses.[9,10] The complete list (Figure 1) included competencies in the following general areas: Orientation to Public Health, Analytic Skills, Basic Public Health Sciences, Communication/Cultural Skills, Policy Development/Program Planning Skills, Financial Planning and Management Skills, and Computer Skills.

Inventory One—
training and development institutions
We looked beyond traditional public health educational institutions to find as many resources as pos-

Figure 1. Public health competencies

BASIC ORIENTATION TO PUBLIC HEALTH:
- Core functions of public health
- Essential Public Health Services as in *Public Health in America*[a]
- Ethics; values of public health
- Health economics
- Leadership skills
- Legal basis of public health

ANALYTIC SKILLS:
- Defining a problem
- Determining appropriate use of data and statistical methods
- Selecting and defining variables relevant to defined public health problems
- Evaluating the integrity and comparability of data and identifying gaps in data sources
- Understanding how the data illuminate ethical, political, scientific, economic, and overall public health issues
- Understanding basic research designs used in public health
- Making relevant inferences from data

COMMUNICATIONS SKILLS:
- Communicating effectively both in writing and orally
- Presenting accurately and effectively demographic, statistical, programmatic, and scientific information
- Soliciting input from individuals and organizations
- Advocating for public health programs and resources
- Leading and participating in groups to address specific issues
- Using the media to communicate important public health information

CULTURAL SKILLS:
- Understand the dynamic forces contributing to cultural diversity
- Interacting sensitively, effectively, and professionally with persons from diverse cultural, socioeconomic, educational, and professional backgrounds, and with persons of all ages and lifestyle preferences
- Identifying the role of cultural, social, and behavioral factors in determining disease, disease prevention, health promoting behavior, and medical service organization and delivery
- Developing and adapting approaches to problems that take into account cultural differences

COMPUTER SKILLS:
- Informatics and telecommunication technology
- Other computer skills

POLICY DEVELOPMENT/PROGRAM PLANNING SKILLS:
- Collecting and summarizing data relevant to an issue
- Stating policy options
- Articulating the health, fiscal, administrative, legal, social, and political implications of each policy option
- Stating the feasibility and expected outcomes of each policy option
- Deciding on the appropriate course of action
- Writing a clear and concise policy statement
- Developing a plan to implement the policy, including goals, outcome and process objectives, and implementation steps
- Translating policy into organizational plans, structures, and programs
- Identifying public health laws, regulations, and policies related to specific programs
- Developing mechanisms to monitor and evaluate programs for their effectiveness and quality

BASIC PUBLIC HEALTH SCIENCE SKILLS:
- Defining, assessing, and understanding the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention, and factors influencing the use of health services
- Understanding research methods in all basic public health sciences
- Applying the basic public health sciences including behavioral and social sciences, biostatistics, epidemiology, environmental public health, and prevention of chronic and infectious diseases and injuries
- Understanding the historical development and structure of state, local, and federal public health agencies
- Nursing process; public health process; systems thinking
- Quality and outcomes evaluation

FINANCIAL PLANNING AND MANAGEMENT SKILLS:
- Developing and presenting a budget
- Managing programs within budgetary constraints
- Developing strategies for determining budget priorities
- Monitoring program performance
- Preparing proposals for funding from external sources
- Applying basic human relations skills to the management of organizations, individuals, and the resolution of conflicts
- Managing personnel
- Understanding the theory of organizational structure and its relation to professional practice
- Negotiation and change theory

[a]Available from: URL: http://www.health.gov/phfunctions/public.htm

sible because many of the competencies are not specific to public health; they can be taught by non-public health institutions or delivered anywhere by distance-learning technology such as satellite transmission and interactive television (ITV).

Using Peterson's *Guides to Distance Learning and Nursing Programs*,[11,12] we developed a database of 462 institutions that could deliver competency-related programs to our Northeast region or to the national public health nursing community. Another 284 institutions were identified by the project's regional and national advisory committees through exhibits at the American Public Health Association (APHA) 1998 Annual Meeting, the Training Expo-Lit catalog, and membership lists of the Nursing Organization Liaison Forum and the Association of State and Territorial Health Officers (ASTHO). An additional eight institutions were identified by members of two list-servs (APHA state affiliates and APHA Health Services Administration Section) who responded to our call for information. Schools of public health were not specifically targeted since information about them was already readily available to us and could be added to the capacity map without incurring the time and cost of the inventory process.

From December 1998 to July 1999 we mailed each of the 746 institutions a letter asking them to fill out a questionnaire if they had or were planning non-degree training or distance learning programs. The survey[13] was designed to determine whether an institution could contribute to public health training either by providing local access to distance learning resources (such as through satellite downlinks or ITV facilities), by offering local continuing education training, or by originating distance training in any of the competencies.

A high response rate was neither expected nor obtained since no funding was available for incentives and many of the institutions had no prior identification with public health and/or with the Northeast. Still, 191 institutions reported relevant public health training and/or distance learning resources. We received completed questionnaires from colleges and universities (136), health-related training programs and institutes (22), state health departments (17), professional organizations (10), and others (6). These 191 institutions reported a variety of distance learning technological capacities including video conferencing (61%), satellite downlink (50%), satellite transmission (26%), Internet audio broadcast (35%), and Internet video broadcast (33%). The list of institutions sorted by state, including their answers to relevant questions, are listed at http://www.cphp.pitt.edu/training/sectiona.html.[14]

This survey also identified the areas of competency training offered by these institutions, as shown in Table 1. Of the 191 institutions, 126 currently offered non-degree training programs in at least one of the competency domains, and 101 planned distance training or brief (less than one week) on-site courses for the upcoming year (through June 2000) in one or more domains.

Inventory Two—training and development modules
We wanted concrete information about the individual training modules (discrete for-credit courses, lectures, or educational materials) available from these institutions so that we could use as many as necessary in our training programs. We sent a second questionnaire (the module survey)[15] from April through July 1999 by mail to the 191 institutional respondents. We also sent a notice of the module survey to 716 of the original

Table 1. Institutions responding to initial survey (*n* = 191), by competency domains of current and anticipated training programs, December 1998 to July 1999

Public health competency domain	Institutions with current programs		Institutions with anticipated programs[a]	
	Number	Percent	Number	Percent
One or more domains	126	66	101	53
Basic orientation to public health	46	24	44	23
Analytic skills	57	30	42	22
Communications and cultural skills	76	40	51	27
Computer skills	72	38	29	15
Policy development/program planning	47	25	34	18
Basic public health science	52	27	45	24
Financial planning and management	57	30	32	17

[a]Either distance-accessible or on-site for up to one week; offered July 1999 through June 2000.

754 institutions for which fax numbers or e-mail addresses were available, informing them of a website they could use to reply. This survey asked detailed questions about individual training modules including the title of each module, its objectives, content description including covered competencies, developers and faculty, method of delivery, and cost.

We obtained information on a total of 196 training modules. We report here on the 129 distance-accessible modules with no on-site or academic credit requirements. A variety of methods produced this information. Project staff abstracted material from websites including those of the Public Health Training Network (51 modules),[16] the Public Health Foundation (31),[17] the Global Health Network Supercourse (21), and additional websites provided by respondents (5).[18] Survey responses via hard copy or the Web described 18 modules. Catalogs, course material, or other written material abstracted by project staff and verified by the source institutions gave information on three modules.

The quantity and depth of information varied from module to module, but some interesting patterns emerged. The majority of distance-accessible modules cost less than $100, and many such as those from the Supercourse were free. We found an uneven distribution of the modules across competency domains. Table 2 shows that of the 129 distance training modules, 64% (83 modules) were concentrated in the domain of basic public health science. These modules addressed areas of public health practice (such as infectious disease epidemiology) that are likely to be useful to fewer and more specialized groups of public health workers than other practice areas. In contrast, fewer distance-accessible modules covered the competency domains of more likely usefulness to public health workers generally. Methods of delivery, also shown in

Table 2, concentrated among the Internet, videotape, and slides (the latter for science modules only).

Producing a workforce development capacity map
Using the three types of resources or building blocks,[6] we next produced a model capacity map for workforce development (see Figure 2). At the center of the map are the primary building blocks—assets and capacities located within and/or controlled by the agency. We included here the Web addresses to access free Web-based lectures and reasonably priced traditional media such as books, worksheets, and videos because these resources are available to motivated workers regardless of their employers' involvement. The primary building blocks also include the human resources of an agency (staff and leaders), since they are important in its development as a learning organization.[19]

Next are the secondary building blocks—assets located or controlled outside the agency but accessible to it at moderate cost. Local educational institutions, for example, may be able to provide satellite and video conferencing equipment and/or courses with little outlay of money. For some of these resources, travel is needed; however, since the resources are local or regional, travel costs and overnight stays would be minimal. Not all of these resources are available to all agencies, but most are likely to be within their reach. Finally, "potential" assets require greater resources than are likely to be easily available at local agencies. For example, not all applicants win acceptance to the National Leadership Training Program or to schools of public health. Additional barriers, such as transportation costs and lost work time, can be substantial. While not everyone in an agency needs or can access these resources, some access for all agencies is desirable.
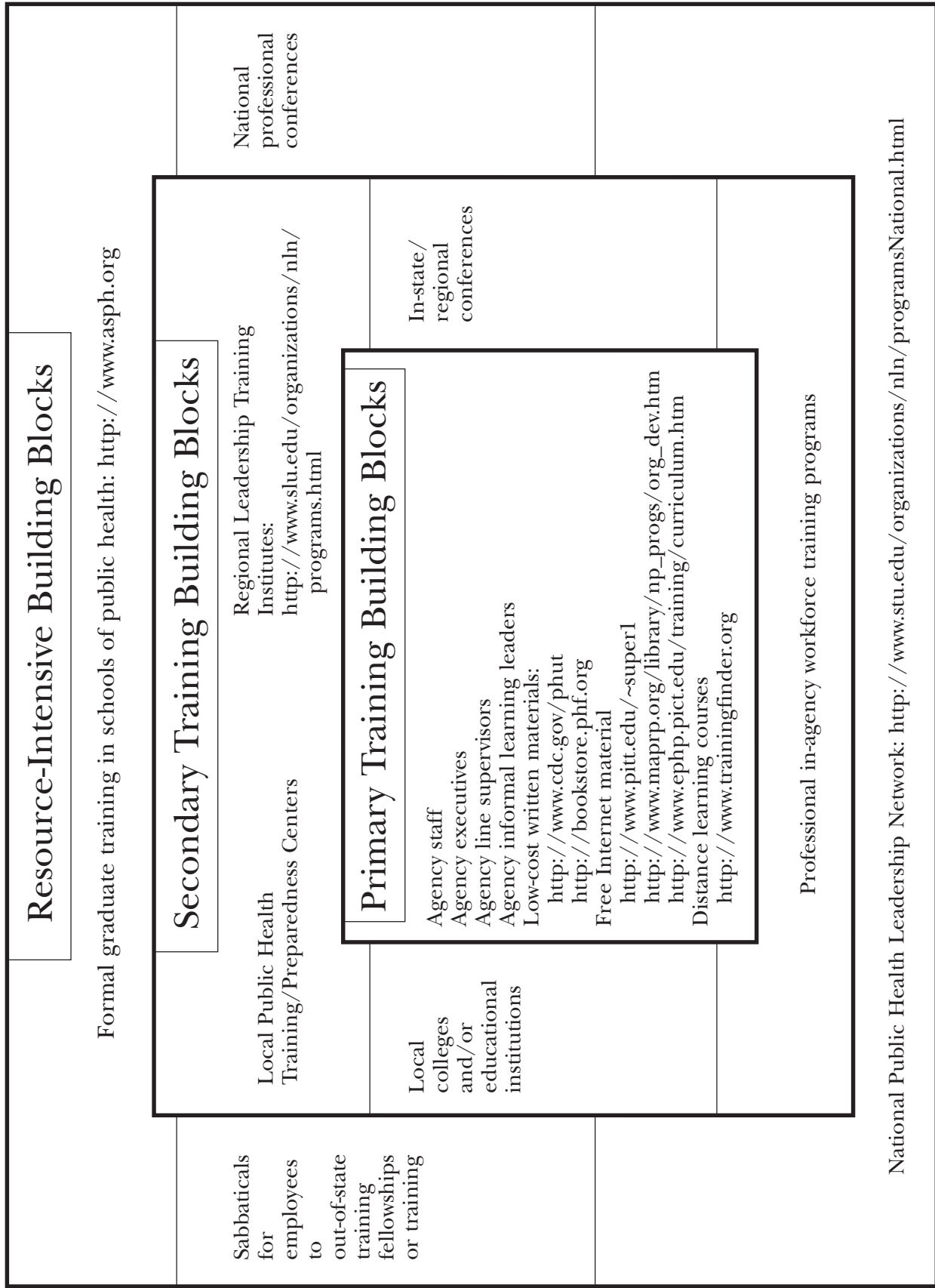
The capacity map shown in Figure 2 illustrates how

Table 2. Distance training modules identified through module survey, by competency domain, April 1999 to July 1999 (*n* = 129)

Competency domain	Total		Internet	Satellite	Videotape	Print	Slides	Other[a]
	Number	Percent						
Basic orientation to public health	6	5	1		2	2		1
Analytic skills	12	9	9			2		1
Communications and cultural skills	8	6		1	4			3
Computer skills	8	6	6		2			
Policy development/program planning	5	4	4		1			
Basic public health science	83	64	13	9	23	9	27	2
Financial planning and management	7	5	3		3			1

[a]Includes interactive television, CD-ROM, diskette, and video/print.

Figure 2. A model workforce development capacity map

Resource-Intensive Building Blocks

Formal graduate training in schools of public health: http://www.asph.org

Secondary Training Building Blocks

Regional Leadership Training Institutes: http://www.slu.edu/organizations/nln/programs.html

Primary Training Building Blocks

Agency staff
Agency executives
Agency line supervisors
Agency informal learning leaders
Low-cost written materials:
   http://www.cdc.gov/phut
   http://bookstore.phf.org
Free Internet material
   http://www.pitt.edu/~super1
   http://www.maprp.org/library/np-progs/org_dev.htm
   http://www.ephp.pict.edu/training/curriculum.htm
Distance learning courses
   http://www.trainingfinder.org

In-state/regional conferences

National professional conferences

Local colleges and/or educational institutions

Local Public Health Training/Preparedness Centers

Sabbaticals for employees to out-of-state training fellowships or training

Professional in-agency workforce training programs

National Public Health Leadership Network: http://www.stu.edu/organizations/nln/programsNational.html

to conceptualize the available workforce development resources and training. The map shows building blocks at the national and local level and can be adapted to local needs. It is both a data analysis method and a dissemination strategy. Capacity mapping helps people to conceptualize and access resources that they might not otherwise be aware of.

LIMITATIONS

The approaches described here have a number of limitations. The low response rates to both the institutional and module surveys were not surprising, given their length and the lack of incentives to respond. Nevertheless, far more resources than those we found are likely to exist, and those we found may or may not be typical. Local and state health departments may have better success in locating resources available from institutions near to them on the basis of familiarity and long-term relationships.

For the second (module) survey in particular, the amount of information we requested along with a lack of incentives were barriers to obtaining good information directly from the institutions. Many of the websites and course materials provided in response to the survey did not contain all of the desired information. Nor did the survey information alone permit our assessment of quality or proficiency level for any of the modules. Agencies and individuals must continue to make these judgments themselves.

Competency domains capture many related skills and competencies, each of which is arguably more precise to individual needs and therefore more appropriate for classifying a training program. But our attempt to categorize modules by specific competencies rather than by domain was ineffective. Most modules appeared to address aspects of many competencies, and few modules taught all of the specific competencies within a domain.

Finally, the inventories are just a "snapshot" of the available resources at a given point in time. With the passage of time, they can no longer provide a reliable source of information about particular modules or training providers. Readers are directed instead to use the capacity map as a methodological guide to finding training resources independently.

CHALLENGES FOR PUBLIC HEALTH AGENCIES

A local health department may not be able to tap all of the assets listed in Figure 2. For some assets, the agency might have to make infrastructure investments; for others it might have to develop relationships with lo-

cal training institutions. Substantial financial investment is needed to use the resource-intensive building blocks listed. However, even without a great investment, some training can take place, and individuals can access the resources in the primary building blocks section on their own. Furthermore, the strength of the capacity mapping approach is its ability to increase local public health agencies' knowledge of training resources and opportunities, thereby maximizing even the most limited training budgets.

Perhaps the biggest challenge to a capacity mapping approach is that agencies might never make sufficient investments in training because they will view the primary building blocks as the total solution to their needs. Although the primary building blocks are an excellent start and can serve the highly motivated worker and agency well, they are not a complete solution. Many workers need both the motivation and structure that come from the secondary building blocks. Even exceptional workers are likely to need the personal interaction and guidance offered by these external resources in order to fully develop their leadership and public health science skills.

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