State and local health departments (LHDs) are increasingly conducting community health assessments, using models such as Mobilizing for Action through Planning and Partnerships. Within the peer-reviewed literature, relevant Web sites, and textbooks on health planning, there is limited practical guidance for bridging data collection and prioritization. The purpose of this article was to provide examples of how LHDs have bridged these steps through “data synthesis.” We provide examples from 3 LHDs that have extensive experience with the Mobilizing for Action through Planning and Partnerships model. The LHDs provide a detailed synopsis of data synthesis activities, including the setting, participants, processes, and outcomes. Commonalities between the LHDs’ processes emerged, including daylong (or more) retreats, multiple nominal group-like techniques, and iterative approaches to reduce the number of strategic issues. These processes provide examples of data synthesis and are relevant to current practice, given the national voluntary accreditation process and the new nonprofit hospital requirements to conduct community health assessments.

KEY WORDS: community health assessment, data synthesis, local health department, public health systems and services research

Local and state health departments are increasingly being called on to lead, facilitate, or engage in conducting community health assessments (CHAs). The national voluntary accreditation program under the Public Health Accreditation Board requires CHAs as a prerequisite for applying for accreditation, and, as part of the Affordable Care Act, the Internal Revenue Service has recently revised the community benefits requirements for nonprofit hospitals to conduct CHAs.

There are several CHA models currently in use by local health departments (LHDs). These include the following: Mobilizing for Action through Planning and Partnerships (MAPP), developed by the National Association of County & City Health Officials (NACCHO); the Association for Community Health Improvement’s CHA Toolkit; the Centers for Disease Control and Prevention’s CHANGE; and state-developed models. Older processes such as APEXP (Assessment Protocol for Excellence in Public Health) are also still in use.

While most models provide clear guidance for many of the steps involved in conducting CHAs, particularly for the actual qualitative and quantitative data collection processes and for prioritization, there is relatively little practical guidance for bridging the steps of data collection and prioritization to synthesize the various types of data. The purpose of this article was to provide examples of how LHDs have facilitated the completion of this bridging step, which is hereafter termed “data synthesis.” For purposes of this article, “data synthesis” is defined as the process for assessing, merging, and

---

**Author Affiliations:**
Department of Public Health, University of Tennessee, Knoxville (Drs Erwin and Knight and Ms Graham); Northern Kentucky Health Department, Edgewood (Mr Kalos and Ms Kent); mglenn.oxd, Cincinnati, Ohio (Dr Glenn); East Central District Health Department, Columbus, Nebraska (Ms Rayman); and Knox County Health Department, Knoxville, Tennessee (Mss Read and Welch).

The authors acknowledge Lauren Shirey and Reena Chudgar, both from the National Association of County & City Health Officials (NACCHO), who through their work leading the Community Health Assessment Workgroup for NACCHO provided the impetus for this article.

**Disclosure:** The authors declare no conflicts of interest.

**Correspondence:** Paul Campbell Erwin, MD, DrPH, FACPM, Department of Public Health, University of Tennessee, 1914 Andy Holt Ave, Knoxville, TN 37996 (perwin@utk.edu).

DOI: 10.1097/PHH.0b013e31828000f7
melding multiple data collection results or findings to provide a broadly informed understanding of community health issues of importance—the critical step that must precede final prioritization of issues.

In MAPP (Figure), data synthesis occurs after completion of the 4 separate assessments in the phase “Identifying Strategic Issues.” This phase begins with reviewing the vision and values and the summaries of assessment findings, which should lead to a discussion on cross-cutting issues, prominent findings, and the gaps between the current state and vision. MAPP users are then directed to brainstorm strategic issues, understand why issues are strategic, determine consequences of not addressing an issue, consolidate overlapping or related issues, and arrange issues into an ordered list. The MAPP model does not, however, provide sufficient guidance on exactly how these steps are to be completed. We provide examples of data synthesis from 3 LHDs that have extensive experience with MAPP, both in implementation and in leadership (with 3 of the authors having served as NACCHO MAPP Workgroup chairs). While these examples are based on the MAPP model, the processes for data synthesis can be applied to other CHA models as well.

● Methods

Three LHDs, which have been conducting CHAs over a period of several years and have long-standing connections to MAPP, were asked to provide a synopsis of their data synthesis activities, including details of the setting, participants, processes, and outcomes. Each LHD site has served as the primary facilitator for its CHA processes, with broad multisectoral community participation. These LHDs are the Northern Kentucky Health Department (NKHD), the East Central District Health Department (ECDHD) of Nebraska, and the Knox County Health Department (KCHD) in Tennessee. Descriptive information on these LHDs is provided in Table 1.

● Results

Northern Kentucky Health Department

The setting

The NKHD is located at the northern tip of Kentucky in an area ranging from an urban inner core along the Ohio River just south of Cincinnati to suburban and rural settings. It has been engaged in various community assessment and planning processes since 1993, including APEXPH and PACE-EH ( Protocol for Assessing Community Excellence in Environmental Health). The NKHD’s first iteration of MAPP took place as a demonstration site in 2000, and a second iteration of MAPP began in 2008. The NKHD collaborated with Vision 2015, a local organization charged with overseeing the region’s shared strategic plan, to fulfill an objective related to livable communities.

Participants

A 27-member MAPP Leadership Team provided core leadership and continuity throughout the MAPP process. NKHD Director and Vision 2015 President were members of the MAPP Leadership Team, whereas 2 other community leaders cochaired this group. Nearly 200 community members were invited to participate in the Leadership Team. They represented more than 120 organizations in the local public health system. Community members engaged in 1 of 4 MAPP assessment workgroups according to their interest or area of expertise. Health Department planning staff facilitated all but the synthesis process.

Process

The synthesis of data into strategic issues was a 2-step process. The first step was a more traditional distillation of data using a variety of prioritization methodologies. In this phase, primary and secondary data sets were analyzed and prioritized by members of each assessment workgroup. Prioritizing methods included nominal group technique, a modified Hanlon process, and

Copyright © 2013 Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.
simple voting. A set of prioritized issues was generated for each assessment. Upon completion of the 4 assessments, all participants were invited to attend a strategic planning retreat, the second step in the data synthesis process. The retreat process was designed and led by an independent professional facilitator, with guidance from NKHD planning staff. Prior to the retreat, all participants were provided a written summary of each of the 4 assessments. The retreat consisted of two five-hour days sessions, with 78 people participating.

At the outset of day 1 of the retreat, participants reviewed the priorities and analysis summaries from the assessment workgroups and began to draw conclusions and identify commonalities from the findings. The synthesis methodology evolved from developing recommendations that were generated by the question: Which issues suggested by the assessment findings must be addressed to achieve the MAPP vision: “Thriving people living healthy lifestyles in a vibrant community?” Potential strategic issues were initially identified by individuals at each of the several tables and then discussed openly at each table. The full group identified 16 potential strategic issues, and in 2 subsequent rounds members were invited to join a strategic issue small group of their choice—this in effect resulted in a “voting by their feet” process. Several of the potential strategic issues identified were dropped because of no participant interest. Each small group used a common template designed by the facilitator to further define the nature and scope of their strategic issue. After this day 1 synthesis, the full group was adjourned and asked to complete an online survey to (a) further prioritize their top-5 strategic issues and (b) write a goal and a strategy for their first and second prioritized strategic issues. The survey group was encouraged to use PEARL (Propriety, Economics, Acceptability, Resources, and Legality) criteria for selecting the strategic issues. The online survey was sent to 193 community members (attendees and nonattendees); the overall response rate was 34% (63/184), with a response rate of 49% (38/78) for day 1 attendees.

During day 2 of the data synthesis process, the attendees reviewed the survey findings and self-selected into small groups to apply the online survey findings to draft a plan for a top-rated strategic issue. The strategic plan for each group consisted of a measurable goal, strategies, and accountable parties. During the group self-selection process and strategic planning process, the original 16 strategic issues were ultimately consolidated to 4 strategic issues that were presented and discussed by the entire group.

**Outcomes**

This process resulted in the identification of 4 overarching strategic issues (Table 2) and suggested strategies for each. The resulting community health improvement plan (CHIP), *Vision for a Healthy and Vibrant Community 2009*, was jointly published by the NKHD and Vision 2015. The oversight for the ongoing CHIP implementation has been assumed by the Northern Kentucky Chamber of Commerce and Vision 2015, with the NKHD continuing in an advisory capacity.

**East Central District Health Department**

**The setting**

The ECDHD, located in rural Nebraska, is on its third iteration of MAPP since 2002. Each of the 4 counties in the district is unique, and while the ECDHD has 1 shared comprehensive community health needs assessment (CHNA), the district conducted county-specific strategic issues and planning processes to develop a CHIP for each county. More than 30 sources of data make up the CHNA, including focus groups, local agency assessments, written surveys, telephone surveys, Behavioral Risk Factor Surveillance System, Youth Risk Behavioral

### TABLE 1 Descriptive Information on Local Health Department Study Sites

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Northern Kentucky Health Department</th>
<th>East Central District Health Department (Nebraska)</th>
<th>Knox County Health Department (Tennessee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational structure</td>
<td>4-county independent districta</td>
<td>4-county independent districta</td>
<td>Metropolitan Health Departmenta</td>
</tr>
<tr>
<td>Catchment populationb</td>
<td>400,000; mix of urban, suburban, and rural</td>
<td>52,000; predominately rural</td>
<td>432,000; predominately urban, with suburban and rural mix</td>
</tr>
<tr>
<td>Employees (full-time equivalents)b</td>
<td>192</td>
<td>64c</td>
<td>281</td>
</tr>
<tr>
<td>Budgetb</td>
<td>$16.7 million</td>
<td>$4.12 million</td>
<td>$27.2 million</td>
</tr>
<tr>
<td>State accreditation</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>State-required community health assessment</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

aGoverning authority is local.
b2010 data.
cIncluding its associated Federally Qualified Health Center.
Participants

The general public has been invited to all CHIP meetings, with newspaper advertisements, in addition to sending out targeted invitations. In Platte County, the largest county in the ECDHD, approximately 70 individuals attended the daylong meeting. Participants included local leaders in health and health care, the business community, schools, law enforcement, local nonprofit agencies, as well as elected or appointed local and state-level government officials.

Process

Because of the breadth and depth of the CHNA, an independent local research firm was engaged to review the data and provide a draft set of community health needs for the district overall and for each individual county. The research firm identified prominent themes according to the importance to the community, whether the issue was measurable, and the extent to which the issue was an outlier in comparison with state and US data. This step identified 7 crosscutting themes for Platte County and a total of 13 for the district.

In preparation for the Platte County CHIP meeting, a 1-hour presentation was developed, highlighting these identified themes, with additional data the core team (consisting of the Health Department, the Hospital, United Way, and Connect Columbus) believed was important. The daylong meeting started with the CHNA data presentation by ECDHD Health Director, who probed the participants on what surprised them, what insights they gathered, and what questions they had, resulting in a very interactive process with strong audience participation. Each table had a copy of the CHNA and a 1-page summary on crosscutting themes both for the district and for Platte County (as identified by the research firm). The facilitator then revisited the vision statement and asked, “If ‘Healthy Communities, Healthy Families’ were the norm in Platte County, what behaviors, outcomes, policies, and community relationships would we see in place?” After an open discussion, participants were asked to offer criteria to determine priority issues and subsequently selected 12 criteria, including whether addressing the issue was feasible, measurable, and sustainable. Using these criteria, participants were asked individually and then as a table of 8 participants to list 5 top health priorities for the county. These were collected for display on a “sticky wall,” using the Technology of Participation process. All issues from all tables were grouped by common themes on the “sticky wall,” which resulted in the identification of 10 “issue arenas.” Some of the issue arenas had been identified by the independent researchers as crosscutting themes, and some were not; however, all issue arenas were supported with data. Table teams used the criteria for prioritization and rank-ordered the 10 issue arenas that emerged from the clustering exercise and selected the top 5 as final strategic issues for subsequent planning, including the specification of goals, objectives, and measures, that the group would spend the next 3 years working on.

TABLE 2  Strategic Issues Identified Through Data Synthesis, by Local Health Department Site

<table>
<thead>
<tr>
<th>Site</th>
<th>Strategic Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Kentucky Health Department</td>
<td>How does the region improve access to primary care, mental health services, substance abuse services, and dental services to low-income families in the most cost-effective and coordinated manner? How can we achieve a defined and measurable collaborative effort between businesses and governmental nonprofit sectors to comprehensively address the interrelated issues facing our community? How do we make &quot;real&quot; change in the nutrition and physical activity choices families make that affect their children’s health? How can we best provide education and awareness activities to improve lifestyle choices that impact health (ie, smoking, nutritious foods, physical activity, preventative or regular health care, prenatal care)?</td>
</tr>
<tr>
<td>East Central District Health Department</td>
<td>Obesity, Access to health care, Family support, Mental health services, Substance abuse</td>
</tr>
<tr>
<td>Knox County Health Department</td>
<td>How can we achieve equitable health outcomes for all community members? How can we create a sustainable network of partnerships that effectively contributes to improved community health? How can we position health as a consideration in community policy and planning decisions?</td>
</tr>
</tbody>
</table>

4Formulated as “issue arenas” rather than as questions.
Outcomes
The data synthesis process resulted in the formulation of 5 strategic issues for Platte County (Table 2). This process has been used in all 4 counties; participants have rated the process very high on evaluations and are demonstrating a sense of ownership. The 4 counties in the service area are in various stages of completing their CHIP, with Platte County being 6 months into implementation of its CHIP. In Platte County, the 5 groups formed to address the 5 health priorities are chaired by different organizations and each group meets independently; each group reports back to the community as a whole on a quarterly basis. An early indicator of success is the awarding of 2 grants—$20,000 and $150,000—to address identified issues in the community, with $25,000 in local community match funding.

The Knox County Health Department
The setting
The KCHD manages a comprehensive array of public health services, ranging from maternal and child health (primary prevention) to air quality, school health nursing, and the county’s ambulance contract. While it has an urban/metropolitan core, the outskirts of Knox County are similar to the other surrounding rural Appalachian counties.

Participants
Knox County’s MAPP process, called “Together! Healthy Knox” (T!HK), is facilitated by the KCHD and led by a 20-member leadership team, with representatives from multiple sectors of the local public health system: private business, recreation, local government, and health care providers, among others. In 2009 and 2010, T!HK participants completed the 4 MAPP assessments, with contributions from more than 3000 community members through focus groups, completed surveys, daylong large-group activities, and other mechanisms. In the fall of 2010, the 5 member T!HK executive team (a subgroup of the leadership team) worked with KCHD staff to design a process, using guidance from the NACCHO MAPP Web site, for synthesizing data to identify strategic issues.

Process
In February 2011, T!HK leadership team members were asked to form working pairs to review the 4 T!HK summary reports (the MAPP assessments), along with local health inequity data compiled by the KCHD, and to identify 7 to 10 significant data points. For the purposes of this process, significant data points were defined as data that were surprising (eg, lower-income neighborhoods in Knox County have higher average food prices), that indicated a greater problem (eg, 52% of residents surveyed listed obesity as the county’s top health problem), or that merited a closer look or more context (eg, the local public health system’s area of lowest performance was linking people to needed health services). Pairs met during the month of February, and each pair sent its significant data points via e-mail to KCHD staff facilitators.

Staff facilitators printed each identified significant data point in large font on separate slips of paper. At the March 2011 leadership team meeting, each working pair read out its data points and posted them on a “sticky wall.” Within 40 minutes, there were nearly 200 pieces of data on the sticky wall. Team members were invited to move data points into categories on the basis of similarity. This process resulted in 17 data categories, to which staff facilitators assigned descriptive titles after the meeting.

At the April 2011 leadership team meeting, team members were presented with a sticky wall with the 17 data categories posted on it in random fashion. They were given a handout with all the significant data contained within each category for their reference during the meeting. Team members used colored tape to make connections between the categories. These connections could be correlation, causation, or any other kind of connection team members deemed significant. Through this process, several “hubs,” or categories, with multiple, centralized connections, appeared, and these were ultimately reduced to 3: (1) inequity/Hispanic community/aging population, (2) linkage to care/mobilizing partnerships/workforce assessment and development, and (3) environment/policy/policy, systems, and environment change.

Outcomes
In April 2011, the T!HK executive team drafted succinctly worded strategic issues on the basis of the 3 final hub categories (Table 2). T!HK announced the strategic issues at a community meeting in May 2011, attended by 120 community members and organizational partners. After an overview, attendees signed up for action teams, one for each strategic issue identified earlier. The team’s action plans would be announced and implementation would begin in the summer and fall of 2012.

Discussion
These 3 cases have commonalities in focusing data synthesis activities through daylong (or more) retreats,
in using multiple planning and quality improvement techniques to synthesize data for identifying strategic issues, and in using iterative approaches to reduce a large number of potential strategic issues to a manageable set for action planning. These commonalities are striking, given that these LHD sites vary significantly in size, scope, organizational structure, and type of catchment population (from metropolitan to suburban to rural). The 3 sites used or adapted several quality improvement processes that are available to practitioners in The Public Health Memory Jogger II, including affinity diagrams, brainstorming, interrelationship diagrams, nominal group technique, prioritization matrices, and team guidelines.

Although the focus of this article was on data synthesis, practitioners may still be challenged with data collection and analysis and prioritization, the steps before and after data synthesis. Even standard health planning textbooks provide detailed guidance and suggest methods to analyze data, especially in relationship to setting priorities, including the Basic Priority Rating System and the PEARL method. Thomas, for example, describes several data analysis methods that allow decision makers to better collect and use data. These methods include demographic, epidemiologic, and spatial analyses; strengths, weaknesses, opportunities, and threats analysis; gap analysis to assess what is needed to achieve goals and objectives; and “what-if” analysis, which allows group members to assess potential impact through simulation techniques.

Data synthesis, as it is defined in this article, has similarities to the more academic process of triangulation in mixed-methods research, where both qualitative and quantitative data are collected and analyzed. Triangulation, first described by Denzin in the late 1960s, is “the combination of 2 or more data sources, investigators, methodologic approaches, theoretical perspectives, or analytical methods” within the same study. Triangulation as an approach used in public health practice has been described by Levy et al in planning community interventions to eliminate health disparities in Chicago and by Rutherford et al in understanding national and local HIV epidemics. Rutherford et al provide 5 guiding principles of what is termed “public health triangulation” and a series of 12 steps in carrying out the public health triangulation process, a process that is described as both inductive and empirical: “We seek to identify hypotheses that explain all the data at hand and suggest a causal relationship between predictor variables (eg, a public health intervention) and outcomes (eg, risk behaviors or infection).” Although this “public health triangulation” is framed more specifically for evaluative processes, its practical application may have utility as a model for data synthesis in broader CHA processes.

**Conclusion**

Data synthesis, as it is defined in this article, is the critical process in CHA that bridges data collection and prioritization. While there is limited practical guidance on how to accomplish this process from the peer-reviewed literature, relevant Web sites, and textbooks on health planning, we provide 3 examples from recent LHD experiences with data synthesis that may be of value to other local or state health agencies. This is particularly relevant to current practice, given the national voluntary accreditation process and the new Internal Revenue Service requirements for nonprofit hospitals to conduct CHAs. Given the likely near-term increase in CHA processes across the nation, there should be ample opportunities to conduct practice-based research in order to improve evidence-based decision making in data synthesis, which, in turn, should result in refining the guidance on data synthesis. Such research might involve, among other approaches, testing models such as the public health triangulation model described by Rutherford et al earlier.

**REFERENCES**