

2009 NATIONAL ASSESSMENT OF EPIDEMIOLOGY CAPACITY

SUPPLEMENTAL REPORT:

*Maternal & Child Health
Epidemiology Capacity:
Findings and Recommendations*

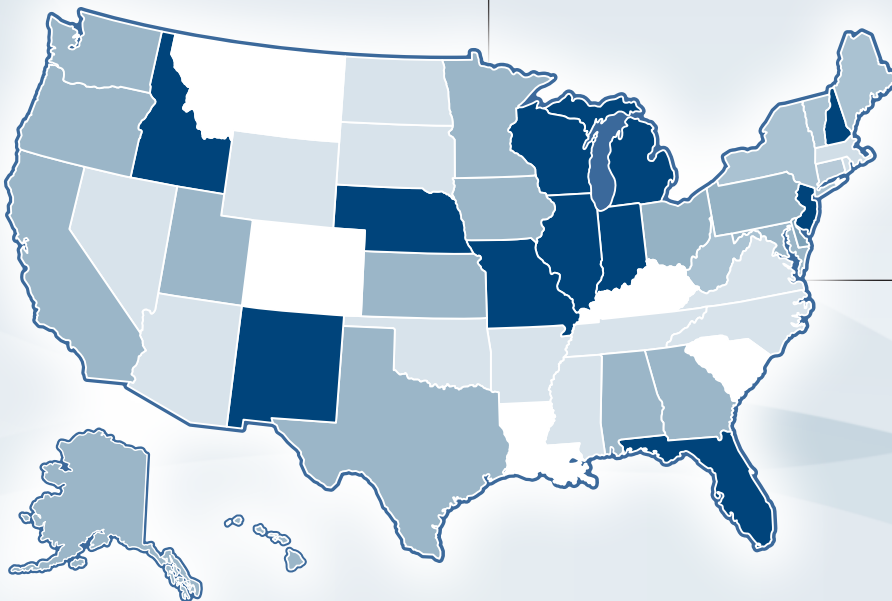


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For more than 5 decades, CSTE and CDC have worked together in partnership to improve the public's health by supporting the efforts of epidemiologists working at the state, territorial, and local levels by promoting the effective use of epidemiologic data to guide public health practice and improve health. CSTE and its members represent two of the basic components of public health: epidemiology and surveillance.

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EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

Background

Over the past century, public health agencies at the state and territorial levels in the United States have developed epidemiology capacities to improve disease control and health promotion. The scope of epidemiologic investigations during this time has broadened from primarily infectious diseases to chronic diseases, maternal and child health (MCH), and other issues.

Building MCH-related analytic capacity in state health departments began in 1987, when the Centers for Disease Control and Prevention (CDC)/Health Resources and Services Administration (HRSA) MCH Epidemiology Program (MCHEP) began assigning MCH epidemiologists to public health agencies to serve as senior scientists. Since then, a wide variety of workforce development initiatives, national and regional conferences, internships, and fellowship opportunities have taken place, including establishment of the CDC/Council of State and Territorial Epidemiologists (CSTE) Applied Epidemiology Fellowship Program in 2003. In parallel to these capacity-building activities aimed at improving the skills of the MCH workforce, the Title V Block Grant has provided supplemental funding to states through the State Systems Development Initiative to facilitate improvement in components of the data infrastructure. MCH epidemiology in the states evolved and matured as states recognized the need for, and took advantage of, these and other capacity-building opportunities.

For many years, no effort was made to systematically assess epidemiology capacity at the state and territorial levels in specific program areas. In 2001, an assessment specifically assessing MCH epidemiology capacity was designed by CSTE's MCH Workgroup with input from the Association of Maternal and Child Health Programs, the Maternal and Child Health Bureau of the Health Resources and Services Administration (HRSA/MCHB), the Division of Reproductive Health of CDC, and several state public health agencies. The assessment was conducted during November 2001–March 2002. Overall, many gaps were identified. On the basis of the assessment findings, CSTE passed a position statement with recommendations in three areas. For human capacity, the workgroup recommended that each state have a minimum of one doctoral-level MCH epidemiologist serving as the lead MCH epidemiologist, and each program should have adequate MCH epidemiology support. For systems capacity, the workgroup recommended that MCH epidemiology and data staff strengthen and expand their data use, including use of MCH-related databases, and that MCH program directors and MCH epidemiology staff should collaborate closely, especially when developing and evaluating policies and plans to carry out the 10 Essential Services of Public Health (ESPH). For MCH data-related activities, the workgroup recommended that MCH directors and MCH epidemiologists should actively participate in national, regional, and state meetings to exchange information.

During 2004–2007, the CDC/HRSA MCHEP supported a detailed assessment of factors related to improved MCH epidemiology capacity in state health agencies, culminating in a 2008 report. The assessment documented what had worked to build MCH capacity, the characteristics of the capacity, and factors that make the difference between successful and unsuccessful models of MCH epidemiology capacity. The main findings were that a number of features of an MCH epidemiology program were associated with a higher level of functioning: 1) an increasingly formal and visible presence in the state agency, particularly a named MCH epidemiology unit or section; 2) an agenda-setting process based on consensus with an array of relevant stakeholders; 3) the combination of a critical mass of key staff who have advanced training along with bringing in CDC assignees, fellows, or interns; 4) an environment

that promotes and permits data sharing both internally and externally; and 5) publications in the peer reviewed literature and submission of abstracts to the MCH Epidemiology conference.

Concurrent with development of the 2009 overall ECA (Core ECA), the CSTE MCH Workgroup decided it was appropriate to assess progress since the 2003 CSTE position statement and to determine the relationship between the level of self-assessed epidemiology capacity and constellations of MCH program structure and other factors associated with MCH epidemiology functioning identified in the 2008 report. The Core ECA and the MCH supplement had several MCH-related objectives. First, the supplement aimed to describe MCH epidemiology and surveillance capacity overall and the ability to perform core ESPH; organization of MCH programs within state health departments; percentage of time primary MCH epidemiologists work on MCH issues and extent of decision making by MCH epidemiologists for MCH programs; degree of access to state data sets; and level of internal and external collaboration; and spectrum of activities in which MCH epidemiologists are involved and resources available to them. Second, the MCH supplement aimed to develop national and state-specific profiles of key MCH epidemiology capacity indicators.

Methods

In September 2008, CSTE MCH Workgroup members began developing the MCH supplement of the 2009 ECA. The workgroup included members from CSTE, CDC, the University of Illinois at Chicago, CityMatCH, and state health departments. After piloting in March 2009, the MCH supplement (MCHS) was sent with the 2009 ECA to the State Epidemiologist of each state and territory in April 2009 with the expectation that it would be forwarded to the state or lead MCH epidemiologist to complete. Data were collected during April 1–June 30, 2009.

The 2009 ECA asked about overall MCH surveillance and epidemiology capacity, academic- and epidemiology-specific training, competencies of MCH epidemiologists, and number of publications. The MCHS asked about organization of MCH epidemiologic activities, spectrum of work covered by MCH epidemiologists, access to data and consultants, the nature of data analysis performed, activities to disseminate data, and collaborations with other state health department programs and with agencies outside the health department.

All 50 states and the District of Columbia completed both the core ECA and the MCHS. A total of 1544 (70%) of 2193 epidemiologists completed individual worksheets, including 292 epidemiologists performing at least some MCH work representing 147 full-time equivalents. The response rate for MCH epidemiologists is not known.

EXECUTIVE SUMMARY

Results

- Overall, 55% of jurisdictions reported at least substantial (>50% of ideal) MCH epidemiology and surveillance capacity. This measure of capacity has progressively increased from 43% in 2004 and 47% in 2006, while the percentage of jurisdictions with minimal-to-no (<25% of ideal) capacity has decreased progressively: from 25% in 2004 and 23% in 2006 to 12% in 2009.
- At least 55% of jurisdictions reported substantial or higher levels of MCH epidemiology capacity for two of the four ESPH dependent on epidemiology capacity: monitoring health status (75%) and diagnosing and investigating health problems (55%). In addition, at least 55% of jurisdictions reported at least substantial MCH epidemiology capacity for two additional MCH epidemiology functions: promoting and contributing expertise to linkage of data systems (57%) and translating analytic findings for program and policy (69%).
- Most MCH programs achieved a high level of epidemiology leadership: 80% have a lead epidemiologist, 72% have a lead epidemiologist who is full time, and 50% have MCH epidemiologists with both scientific and administrative authority.
- At least 46% of MCH programs have an epidemiologist with a doctoral degree, and MCH programs have a higher percentage of PhD-level epidemiology trained staff than do other programs.
- MCH epidemiologists in >50% of jurisdictions contribute at least substantially to a variety of program-level decision making: needs assessment (82%), priority setting (73%), program planning (67%), and performance measurement (67%), and program evaluation (53%).
- MCH epidemiologists in most jurisdictions have unfettered (direct) access to each of eight key data sets (birth certificates, death certificates, linked births–infant deaths and the Pregnancy Risk Assessment Monitoring System in 73% each, fetal death in 69%, Behavioral Risk Factor Surveillance System in 57%, and newborn screening and birth defects registry in 55%).
- MCH epidemiologists in most jurisdictions frequently to routinely perform all five types of calculations asked about, ranging from calculating population-specific rates (90%) to conducting multivariable analysis (57%).
- MCH epidemiologists in most jurisdictions are involved in several key information dissemination and sharing activities: publishing reports (56%) and having abstracts accepted at national meetings (63%).
- MCH epidemiologists in most states collaborate at least frequently with colleagues in three other program areas: oral health (59%), chronic disease (63%), and injury (53%).
- MCH epidemiologists in most jurisdictions collaborate with schools of public health, federal governmental organizations and nongovernment organizations.
- MCH epidemiologists in most jurisdictions have been involved at least frequently in the past year in a wide range of activities asked about, from maternal, child and adolescent health to disparities, including social determinants of health, to case review.

Despite the overall achievements of most jurisdictions, a number of outstanding gaps existed:

- The percentages of jurisdictions with at least substantial epidemiology capacity to conduct program effectiveness evaluation and to conduct research for program innovation are small, 38% and 33%, respectively.
- The one consistent barrier to having almost full to full (>75%) epidemiology capacity to perform the full spectrum of public health services is the number of staff, cited by nearly 90% of all jurisdictions lacking this level of capacity.

- MCH epidemiologists contribute at least substantially to policy decisions in only 38% of states.
- MCH epidemiologists in most jurisdictions lack unfettered access to each of nine data sets of relevance to MCH programs (hospital discharge; Women, Infants, and Children [WIC] programs; family planning; Youth Risk Behavior Survey; abortion; Medicaid; immunization; emergency department, and emergency medical services).
- Even though most jurisdictions reported sharing MCH information through reports and at meetings, only a minority of MCH programs have a publicly accessible, interactive, online query system for vital records and related health data.
- MCH epidemiologists in most jurisdictions rarely or never collaborate with colleagues in several important program areas of high relevance to MCH: mental health (55%), occupational health (69%), and substance abuse (47%).
- In 47% of jurisdictions, MCH epidemiologists have restricted or no ready access to full-text medical, epidemiologic, or public health literature.

Several measures of epidemiology capacity and of organization and role of MCH epidemiologists were strongly related to key MCH epidemiology activities.

- Having at least substantial MCH epidemiology and surveillance capacity was organizationally most strongly associated with having a centralized MCH epidemiologist unit within an MCH program and with having a lead MCH epidemiologist. It was also associated with having higher levels of capacity to monitor health status and to translate findings for program and policy development.
- Having higher levels of MCH epidemiology capacity to monitor health status was strongly associated with a jurisdiction's MCH epidemiologists being substantially involved in decision making, including needs assessment, priority setting, and program planning.
- Having higher levels of MCH epidemiology capacity to conduct evaluation was strongly associated with a jurisdiction's MCH epidemiologists being substantially involved in decision making around priority setting, evaluation and policy development.
- Having higher levels of MCH epidemiology capacity to conduct research for innovative solutions was strongly associated with a jurisdiction's MCH epidemiologists being substantially involved in priority setting, planning, and policy development.
- Having higher levels of MCH epidemiology capacity to translate analytic findings into directly useful information was strongly associated with a jurisdiction's MCH epidemiologists being substantially involved in needs assessment, priority setting, and policy development.
- MCH programs in which the lead epidemiologists had both scientific and administrative authority were more likely than those in which MCH epidemiologists had less to no authority to have substantial involvement in a wide variety of activities and to have more epidemiology capacities, especially capacity to evaluate effectiveness; participate in decision making; have unfettered access to WIC, newborn screening, family planning, and abortion data; and publish reports of their programs and investigations.

EXECUTIVE SUMMARY

Conclusions

- MCH epidemiology and surveillance capacity continued to grow well into 2009, despite the economic downturn. The setting of MCH epidemiology milestones—including development of a centralized MCH epidemiology unit and strong leadership with both scientific and administrative authority—and achievement of the milestones in many states appear to have contributed to continued growth.
- MCH programs in most jurisdictions have substantial capacity in many areas, participate in all areas of decision making, have unfettered access to the most basic data sets, conduct sophisticated statistical analyses, and are involved in a broad spectrum of MCH activities. Their most pressing need is additional staff.
- Despite the achievements, the MCH epidemiology capacity glass is only half full: nearly half of all states lack even substantial MCH epidemiology and surveillance capacity, and in only a minority of jurisdictions do MCH epidemiologists participate substantially in policy development; have access to important data sets; and work with colleagues in substance abuse, mental health, and occupational health.

Recommendations

- MCH epidemiology capacity should be explicitly considered in the national dialogue about addressing the gaps identified in the core ECA in overall state-based epidemiology capacity and ensuring that states have the capacity needed to provide essential data for effective program planning, public health action, evaluation, and policy development.
- Improving capacity in states that have minimal-to-no MCH epidemiology capacity should be a priority. At a minimum, every state should have a lead MCH epidemiologist with both scientific and administrative authority to oversee and coordinate data gathering, analysis, interpretation, and translation to public health practice; at least one epidemiologist with doctoral-level training; and sufficient and well-trained professional support staff.
- The MCH Workgroup may be a model for other program areas that need development of epidemiology and surveillance capacity (e.g., substance abuse, mental health, oral health). Establishment of working groups with CSTE, CDC, and academic representation to discuss gaps and priorities and develop initiatives and milestones, as the MCH Workgroup has done, may be a critical catalyzing step. CSTE in coordination with CDC may be able to facilitate establishment of a workgroup model.
- State MCH epidemiologists should build partnerships to collaborate with substance abuse, mental health, and occupational health epidemiologists.
- Continued monitoring, particularly of gaps in MCH epidemiology capacity, is critical to make additional progress. CSTE should continue to routinely assess state health departments about MCH epidemiology capacity, ideally every 2 years.

BACKGROUND



BACKGROUND

Over the past century, public health agencies at the state and territorial levels in the United States have developed epidemiology capacities to improve disease control and health prevention and promotion. The scope of epidemiologic investigations during this time has broadened from primarily infectious diseases to chronic diseases, maternal and child health (MCH), injury prevention, and other issues.

Building MCH-related analytic capacity in state health departments began in 1987, when the Centers for Disease Control and Prevention (CDC)/Human Resources and Services Administration (HRSA) MCH Epidemiology Program (MCHEP) began assigning MCH epidemiologists to public health agencies to serve as senior scientists. Since then, a wide variety of workforce development initiatives, national and regional conferences, internships, and fellowship opportunities have taken place, including establishment of the CDC/Council of State and Territorial Epidemiologists (CSTE) Applied Epidemiology Fellowship Program in 2003. In parallel to these capacity-building activities aimed at improving the skills of the MCH workforce, the Title V Block Grant has provided supplemental funding to states through the State Systems Development Initiative to facilitate improvement in components of the data infrastructure. MCH epidemiology in the states evolved and matured as states recognized the need for, and took advantage of, these and other capacity-building opportunities.

For many years, no effort was made to systematically assess epidemiology capacity at the state and territorial levels in specific program areas. Beginning in the late 1990s, interest grew, and CSTE began developing modules to assess program area-specific epidemiology and data capacity at state and territorial public health agencies using the Epidemiology Capacity Assessment (ECA). These modules also have allowed CSTE to monitor the Healthy People 2010 Objective 23-14 (1), which calls for an increase in the percentage of public health agencies that provide epidemiology services to support the essential services of public health (ESPH) (2).

The first module for specifically assessing MCH epidemiology capacity was designed by CSTE's MCH ECA Workgroup with input from the Association of Maternal and Child Health Programs (AMCHP), the Maternal and Child Health Bureau (MCHB) of HRSA, the Division of Reproductive Health of CDC, and several state public health agencies. The assessment was conducted during November 2001–March 2002. In December 2002, CSTE published a report based on this assessment (3) that detailed the many gaps that had been identified. On the basis of the assessment findings, CSTE passed a position statement with recommendations in three areas (4). For human capacity, CSTE recommended that each state have a minimum of one doctoral-level MCH epidemiologist serving as the lead MCH epidemiologist and each program have adequate MCH epidemiology support. For systems capacity, CSTE recommended that MCH epidemiology and data staff strengthen and expand their data use, including use of MCH-related databases, and MCH program directors and MCH epidemiology staff should collaborate closely, especially on policies and plans to carry out the 10 ESPH. For MCH data-related activities, CSTE recommended that MCH directors and MCH epidemiologists actively participate in national, regional, and state meetings to exchange information.

During 2004-2007, CDC's Maternal and Child Health Epidemiology Program supported a detailed assessment of factors related to improving MCH epidemiology capacity in state health agencies culminating in a 2008 report (5). MCH capacity as measured by the 2001, 2004, and 2006 ECAs had grown, but little information existed about what had worked to build this capacity, the characteristics

of the capacity, and factors making the difference between successful and unsuccessful models of MCH epidemiology capacity. The objectives of this evaluation were to summarize current patterns of MCH epidemiology capacity and functioning within state health agencies; assess the relative ability of various constellations of structure and process factors to promote effective MCH epidemiology practice; and delineate models of effective MCH epidemiology. Epidemiology capacity was assessed on a functional basis, rating states as functioning below average, average, and above average on the basis of interviews and examination of a packet of materials sent by each state. The main findings were that a number of features of an MCH epidemiology program were associated with a higher level of functioning: 1) having an increasingly formal and visible presence in the state agency, particularly having a named MCH epidemiology unit or section; 2) having an agenda-setting process based on consensus with an array of relevant stakeholders; 3) having the combination of a critical mass of key staff who have advanced training, along with bringing in CDC assignees, fellows, or interns; 4) having an environment that promotes and permits data sharing both internally and externally; and 5) publishing in the peer-reviewed literature and submitting abstracts to the MCH epidemiology conference.

Concurrent with development of the 2009 overall ECA (Core ECA), the CSTE MCH Workgroup decided it was appropriate to assess progress since the 2003 CSTE position statement and to determine the relationship between the level of self-assessed epidemiology capacity and constellations of MCH program structure and other factors associated with MCH epidemiology functioning identified in the 2008 report.

The ECA and the MCH module had several MCH-related objectives. First, they aimed to describe MCH epidemiology and surveillance capacity overall and ability to perform core ESPH; organization of MCH programs within state health departments; percentage of time primary MCH epidemiologists work on MCH issues and extent of decision making by MCH epidemiologists for MCH programs; degree of access to state data sets; level of internal and external collaboration; and spectrum of activities in which MCH epidemiologists are involved and resources available to them. Second, the ECA and the MCH supplement aimed to develop national and state-specific profiles showing the status of key epidemiology capacity indicators.

METHODS



METHODS

In September 2008, CSTE's MCH Workgroup members began developing the MCH supplement of the 2009 ECA. The workgroup comprised members from CSTE, AMCHP, CityMatCH, CDC, the University of Illinois at Chicago, and state health departments. The assessment was piloted in three states in March 2009 as part of the 2009 ECA and modified on the basis of feedback from them. The MCH supplement (MCHS) was sent with the 2009 ECA to the State Epidemiologist of each state and territory in April 2009 with the expectation that it would be forwarded to the state or lead MCH epidemiologist as needed for completion. Data were collected during April 1–June 30, 2009.

The 2009 ECA asked about overall MCH surveillance and epidemiology capacity, academic and epidemiology-specific training, competencies of MCH epidemiologists, and number of publications (6). The MCHS asked about organization of MCH epidemiologic activities, spectrum of work covered by MCH epidemiologists, access to data and consultants, nature of data analysis performed, activities to disseminate data, and collaborations with other state health department programs and with agencies outside the health department.

For these assessments and past CSTE ECAs, an epidemiologist was defined as any person who, regardless of job title, performed functions consistent with the definition of “epidemiologist” in *A Dictionary of Epidemiology* (7). Estimates of epidemiology and surveillance capacity were categorized as follows: full capacity = 100% of the activity, knowledge, or resources described within the question are met; almost full = 75%–99%; substantial = 50%–74%; partial = 25%–49%; minimal = some, but <25%; and none = 0.

All 50 states and the District of Columbia (DC) completed both the core ECA and the MCHS. A total of 1544 (70%) of 2193 epidemiologists completed individual worksheets, including 292 epidemiologists involved at least part time in MCH epidemiology representing 147 full-time equivalents (FTEs). The response rate for MCH epidemiologists is not known.

Data were analyzed by using SAS version 9.1 and Microsoft Excel 2007. Results were tabulated for all responses from the 50 states and DC.

The MCHS enabled examination of the relationships between a number of MCH epidemiology variables, from measures of capacity to program organization and milestones and to desired MCH epidemiologist outcomes. Variables of interest were cross-tabulated, and odds ratios (ORs) and p values were calculated to determine associations between 1) overall epidemiology capacity and selected ESPH; 2) overall epidemiology capacity and key measures of MCH organizational and/or staffing progress; 3) MCH-related ESPH and desired MCH epidemiologist outcomes; and 4) MCH program developmental milestones and desired MCH epidemiologist outcomes. Comparisons were made by using chi square analysis.

RESULTS



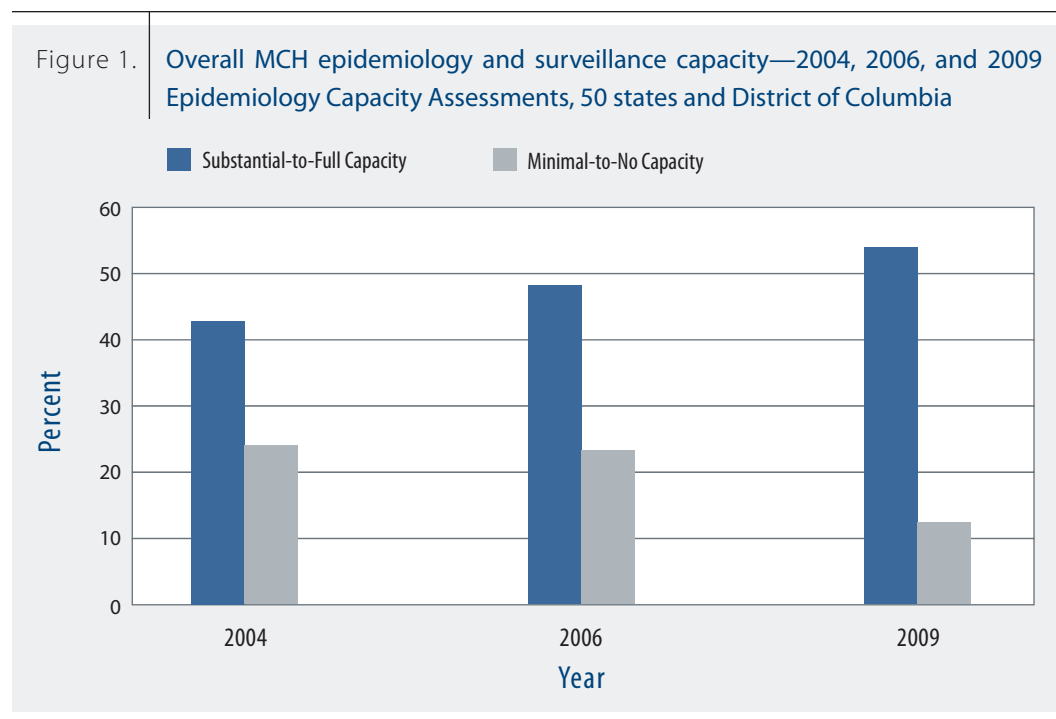
RESULTS

Following are the results of MCH-specific questions from both the 2009 ECA (core ECA) and the MCHS. Unless otherwise specified, the data are based on responses to the MCHS. States and DC are referred to collectively as “jurisdictions.” Descriptive data are presented first, followed by assessment of the association of epidemiology capacity with program organization and selected outcomes and by association of program organization with selected outcomes.

MCH Epidemiology Functional Capacity

The core ECA obtained information about overall MCH epidemiology and surveillance capacity, whereas the MCHS asked specifically about capacity to perform ESPH.

Fifty-five percent of the 51 jurisdictions had at least substantial-to-full overall MCH epidemiology and surveillance capacity, and 12% had minimal or no capacity (Figure 1, Table 1). Substantial or higher level MCH capacity steadily increased in each ECA since 2004, from 43% in 2004 to 47% in 2006 to 55% in 2009. The percentage of jurisdictions with no or minimal capacity decreased (25% to 23% to 12%, respectively).



When examined by capacity related to the ESPH, the percentage of MCH programs having at least substantial capacity was highest for ESPH 1 (monitor health status to identify community health problems)—75% and for ESPH 2 (diagnose and investigate health problems and health hazards in the community)—55%. However, it was well below 50% for ESPH 9 (evaluate effectiveness, accessibility, and quality of personal and population-based health services)—37% and for ESPH 10 (research for new insights and innovative solutions to health problems)—33%. Compared with overall state-level epidemiology capacity to perform the ESPH, a higher percentage of MCH programs had at least substantial capacity for three of the four ESPH (ESPH 1: 75% vs. 65%, ESPH 9: 37% vs. 14%, ESPH 10:

33% vs. 18%). However, many state MCH programs had minimal or no capacity to perform each ESPH, particularly ESPH 9 (24%) and ESPH 10 (37%), and generally fewer than one third had achieved almost full to full (at least 75%) needed capacity (Table 1, Figure 2).

Linkage of data sets is particularly important for MCH epidemiology. A total of 57% of jurisdictions had substantial-to-full capacity to promote and contribute expertise to the linkage of data systems that can facilitate high-level epidemiologic analysis, only 8% had minimal-to-no capacity. Being able to translate findings for others is also an important epidemiology capacity. A total of 69% of jurisdictions had substantial-to-full capacity to translate analytic findings into information that can be directly useful to program and policy staff, legislators, and other decision makers (Table 1, Figure 2).

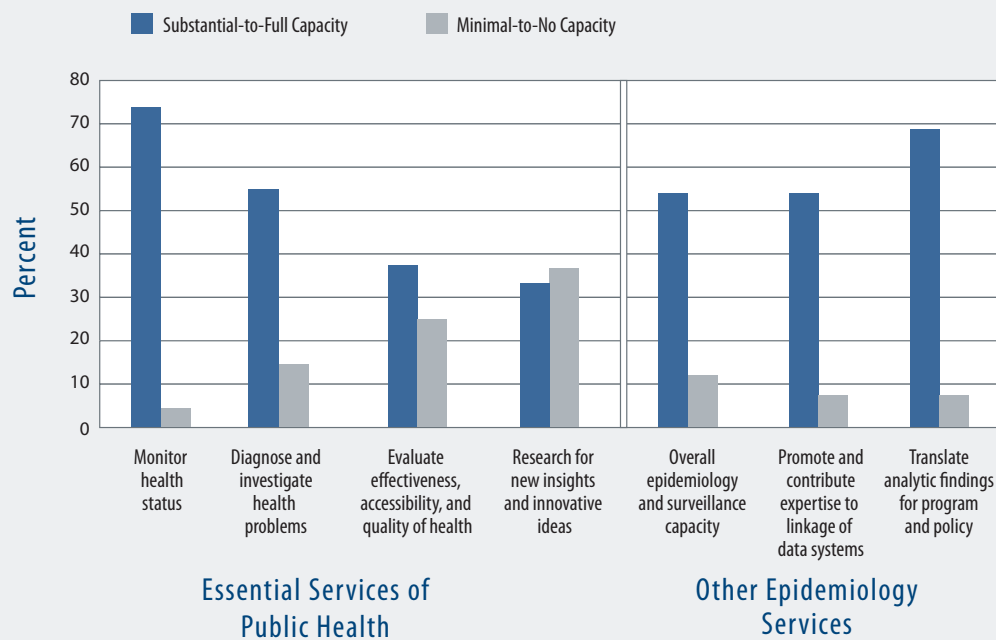
Table 1. **Epidemiology capacity to perform the epidemiology-related ESPH* and other epidemiology-related services—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

EPIDEMIOLOGY SERVICES	NONE	MINIMAL	PARTIAL	SUBSTANTIAL	ALMOST FULL	FULL
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
ESPH 1. Monitor health status to identify community health problems	1 (1.9)	2 (3.9)	10 (19.6)	22 (43.1)	12 (23.5)	4 (7.8)
ESPH 2. Diagnose and investigate health problems and health hazards in the community	1 (1.9)	6 (11.8)	16 (31.4)	17 (33.3)	7 (13.7)	4 (7.8)
ESPH 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services	2 (3.9)	10 (19.6)	20 (39.2)	11 (21.6)	6 (11.8)	2 (3.9)
ESPH 10. Research for new insights and innovative solutions to health problems	4 (7.8)	15 (29.4)	15 (29.4)	11 (21.6)	4 (7.8)	2 (3.9)
Overall epidemiology and surveillance capacity	2 (3.9)	4 (7.8)	17 (33.3)	18 (35.3)	7 (13.7)	3 (5.9)
Promote and contribute expertise to the linkage of data systems that can facilitate high-level epidemiologic analysis	1 (2.0)	3 (5.9)	19 (37.3)	16 (31.4)	10 (19.6)	3 (5.9)
Translate analytic findings into information that can be directly useful to program and policy staff, legislators, and other decision makers	1 (2.0)	3 (5.9)	12 (23.5)	16 (31.4)	13 (25.5)	6 (11.8)

*ESPH, Essential Services of Public Health

RESULTS

Figure 2. Epidemiology capacity to perform epidemiology-related essential services of public health and other epidemiology-related services—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia



Fewer than one third of MCH programs have achieved at least 75% of needed capacity to perform any of the four epidemiology-related ESPH. Respondents who had not already achieved at least 75% (“almost full-to-full”) epidemiology capacity were given an opportunity to indicate whether any of three specific potential barriers existed to achieving each of the four ESPH and each of the two other epidemiology-related capacities previously mentioned. For all six services, >80% of respondents indicated that having inadequate staff was a barrier. Fewer than 10% indicated that having staff with inadequate skills and having inadequate data resources were barriers (Table 2). Three jurisdictions each indicated their staff had inadequate skills or training to promote and contribute expertise to the linkage of data systems and to translate analytic findings for program and policy purposes. According to the core ECA, State Epidemiologists had estimated that 145 additional MCH epidemiologists were needed to achieve full capacity to carry out the four ESPH.

Table 2. **Barriers to almost full-to-full epidemiology capacity to perform the epidemiology-related ESPH* and other epidemiology-related services among jurisdictions having less than almost full capacity—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

EPIDEMIOLOGY SERVICES	N	INADEQUATE NUMBER OF STAFF	STAFF WITH INADEQUATE SKILLS OR TRAINING	INADEQUATE DATA RESOURCES	OTHER [†]
		NO. (%)	NO. (%)	NO. (%)	NO. (%)
ESPH 1. Monitor health status to identify community health problems	35	35 (100.0)	0	0	0
ESPH 2. Diagnose and investigate health problems and health hazards in the community	43	37 (86.0)	0	0	1 (2.3)
ESPH 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services	43	38 (88.4)	1 (2.3)	1 (2.3)	2 (4.7)
ESPH 10. Research for new insights and innovative solutions to health problems	45	40 (88.9)	1 (2.2)	1 (2.2)	2 (4.4)
Promote and contribute expertise to the linkage of data systems that can facilitate high-level epidemiologic analysis	39	33 (84.6)	3 (7.7)	0	2 (5.1)
Translate analytic findings into information that can be directly useful to program and policy staff, legislators and other decision makers	32	29 (90.6)	3 (9.4)	0	0

*ESPH, Essential Services of Public Health.

[†]Outdated software ($n = 3$); lack of evidence-based strategies and/or detailed data/sample size to identify solutions at the community level (ESPH 1,2); lack of individual data at local level (ESPH 1,2); competing priorities (ESPH 2, 10); quality and completeness of data (ESPH 2); staff without MCH background (ESPH 2); lack of access to health care and medical/clinical services for a true and comprehensive evaluation (ESPH 9); lack of access to Medicaid data (ESPH 9); outside scope/mission (ESPH 9, 10 [2]); funding (ESPH 10); no linking infrastructure/lack of information technology resources (linkage [2]); other group performs (linkage); legal access (linkage); lack of demand for deeper levels of information (translate findings).

RESULTS

MCH Epidemiology Program Organization and Leadership

Encouragement of overall scientific leadership and involvement in MCH policy development and of central organization have been areas of emphasis in building MCH epidemiology capacity. The MCHS asked several questions about MCH organization and leadership.

Based on the core ECA, 80% jurisdictions have a lead MCH epidemiologist (Table 3). An additional 10% have more than one MCH epidemiology leader. Leaders of 44 of the 46 jurisdictions with lead MCH epidemiologists have scientific authority for their program or program area; 25 also have administrative authority. In two jurisdictions the epidemiology leaders have only administrative authority. State population (tertiles) was not associated with type of authority of the epidemiology leader.

In 36 (71%) jurisdictions, the primary MCH epidemiologist spent >80% of his/her time (>4 days per week) doing MCH work. In another nine (18%), the primary MCH epidemiologist spent 50%-80% of his/her time (2½–4 days per week) doing MCH work; in six (12%), the primary MCH epidemiologist is less than a half-time position (Figure 3). State population was not associated with amount of time devoted to MCH work by the primary MCH epidemiologist.

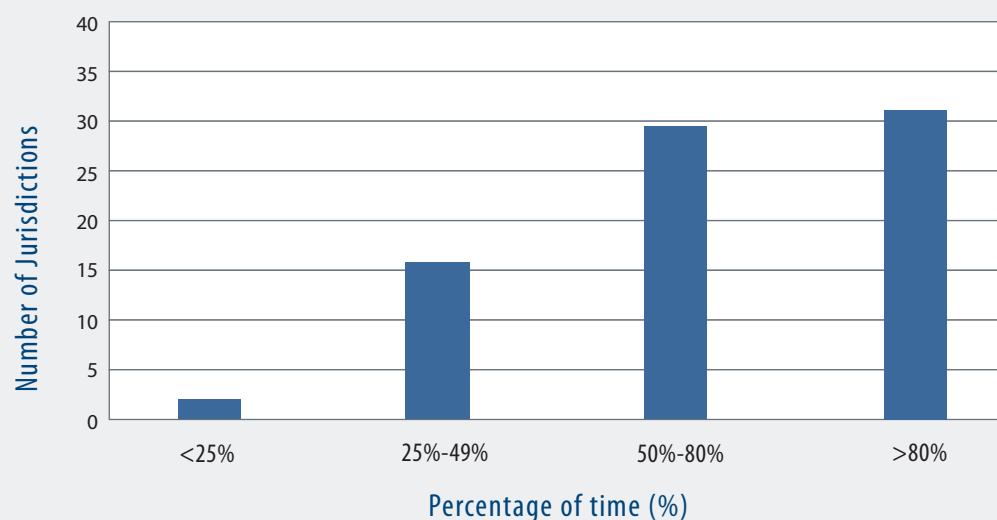
There is no predominate organizational structure for MCH epidemiologists. In 20 (39%) jurisdictions, most MCH epidemiologists are not co-located in the same unit but are scattered throughout MCH activities. In 30 jurisdictions, most are in an MCH epidemiology unit within an MCH program unit. In 13 jurisdictions, most are predominantly in an MCH epidemiology unit that is part of a larger epidemiology or health statistics unit (e.g., vital statistics, chronic diseases) (Table 3). In one jurisdiction, MCH epidemiology activities are provided by staff residing in a university. State population was not related to MCH epidemiologist organizational structure.

Table 3. **Organizational structure of MCH epidemiologists—2009 ECA and Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

AUTHORITY OF MCH EPIDEMIOLOGISTS	YES	NO
	NO. (%)	NO. (%)
Have a lead MCH epidemiologist? (core ECA)	41 (80.4)	10 (19.6)
Have ≥ 1 MCH epidemiology leaders with either or both administrative or scientific authority?	46 (90.2)	5 (9.8)
Both scientific and administrative authority	25 (49.0)	26 (51.0)
Only scientific authority	19 (37.3)	32 (62.8)
Only administrative authority	2 (3.9)	44 (96.1)
Location of most MCH epidemiologists		
Within MCH-related programs but not located together	20 (39.2)	31 (60.8)
In an MCH unit within an MCH program	30 (58.8)	21 (41.2)
In an MCH unit within a larger epidemiology or health statistics unit	13 (25.5)	38 (74.5)
Institution outside health department*	1 (2.0)	50 (98.0)

*University.

Figure 3. **Percentage of time per week the primary MCH epidemiologist spends working on MCH activities—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**



RESULTS

Publications

The capacity to disseminate information is another functional epidemiology capacity. The 2009 ECA examined the number of publications of several types in 2008 by program area. Forty-three jurisdictions responded. Fifteen (35%) were involved in publishing 43 MCH-related articles in peer reviewed journals; 27 (63%) had a total of 123 abstracts accepted at national-level conferences in 2008; and 24 (56%) published 122 other formal reports (i.e., those approved by a state process and published electronically or on paper and/or posted on a website for public consumption).

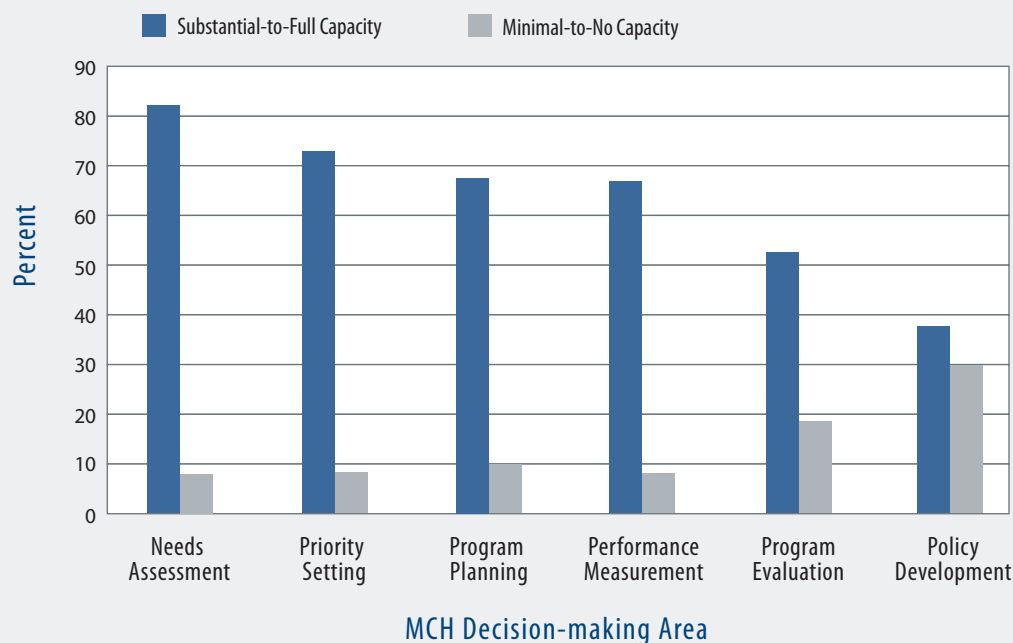
Role of MCH Epidemiologists and MCH Data

In most jurisdictions, MCH epidemiologists directly contributed to key program-level activities. In at least two thirds of jurisdictions, MCH epidemiologists contributed substantially to fully to needs assessment (82%), priority setting (73%), program planning (67%), and performance measurement (67%). In <10% of jurisdictions did they make minimal-to-no contribution (Table 4, Figure 4). The contributions to program evaluation and policy development were more variable, with substantial contributions made by 53% and 37% of jurisdictions, respectively, and minimal-to-no contribution made by 18% and 29%, respectively.

Table 4. **Extent to which MCH epidemiologists in state health departments contribute to decision making for MCH programs—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

CATEGORY OF DECISION MAKING	DEGREE OF CONTRIBUTION TO DECISION MAKING					
	NONE	MINIMAL	PARTIAL	SUBSTANTIAL	ALMOST FULL	FULL
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Needs assessment	1 (1.9)	3 (5.9)	5 (9.8)	14 (27.5)	13 (25.5)	15 (29.4)
Priority setting	1 (1.9)	3 (5.9)	10 (19.6)	18 (35.3)	11 (21.6)	8 (15.7)
Program planning	2 (3.9)	3 (5.9)	12 (23.5)	21 (41.2)	10 (19.6)	3 (5.9)
Performance measurement	1 (1.9)	3 (5.9)	13 (25.5)	12 (23.5)	10 (19.6)	12 (23.5)
Program evaluation	2 (3.9)	7 (13.7)	15 (29.4)	17 (33.3)	6 (11.8)	4 (7.8)
Policy development	3 (5.9)	12 (23.5)	17 (33.3)	13 (25.5)	3 (5.9)	3 (5.9)

Figure 4. Degree of contribution of MCH epidemiologists in state health departments to decision making for MCH programs—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia



MCH Epidemiologists' Access to Relevant Data

MCH epidemiologists potentially need access to a wide variety of data. Ideally this access should be unfettered (i.e., direct), and the data should be available within 1 year after collection. Of the data sets about which the MCHS asked, there were none to which MCH epidemiologists had unfettered access in every jurisdiction. The most accessible data sets were birth certificate, death certificate, linked birth–infant death, and Pregnancy Risk Assessment Monitoring System data (73% each, Table 5). Fetal death (69%), Behavioral Risk Factor Surveillance System (57%), newborn screening (55%), and birth defects data (55%) were available in more than half of states. When data were accessible, they were available within 1 year after collection in at least 65% of states, regardless of data type. Among the most common data sets to which MCH epidemiologists had unfettered access, those with the lowest level of timeliness were fetal death data (available within 1 year in 65% of jurisdictions) and linked birth–infant death data (68% of jurisdictions could provide them within 1 year).

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Table 5. Number and percentage of MCH programs with unfettered access to selected state data sets* and availability of data within 1 year after collection—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

DATA SET	UNFETTERED ACCESS	ACCESS WITHIN 1 YEAR			
	NO. (%)	N [†]	ALMOST ALWAYS/ALWAYS	RARELY	NEVER
			NO. (%)	NO. (%)	NO. (%)
Birth certificate	37 (72.6)	39	32 (82.1)	4 (10.3)	3 (7.7)
Death certificate	37 (72.6)	40	28 (70.0)	7 (17.5)	5 (12.5)
Linked birth–infant death	37 (72.6)	38	26 (68.4)	6 (15.8)	6 (15.8)
PRAMS	37 (72.6)	39	31 (79.5)	3 (7.7)	5 (13.8)
Fetal death	35 (68.6)	37	24 (64.9)	8 (21.6)	5 (13.5)
BRFSS	29 (56.9)	30	27 (90.0)	2 (6.7)	1 (3.3)
Newborn screening	28 (54.9)	28	27 (96.4)	0	1 (3.6)
Birth defects registry	28 (54.9)	27	21 (77.8)	4 (14.8)	2 (7.4)
Hospital discharge	25 (49.0)	28	22 (78.6)	3 (10.7)	3 (10.7)
WIC	23 (45.1)	24	23 (95.8)	0	1 (4.2)
Family planning	22 (43.1)	24	22 (91.7)	0	2 (8.3)
YRBS	21 (41.2)	25	20 (80.0)	3 (12.0)	2 (8.0)
Abortion	20 (39.2)	20	16 (80.0)	3 (15.0)	1 (5.0)
Medicaid	12 (23.5)	17	13 (76.5)	3 (17.6)	1 (5.9)
Immunization	12 (23.5)	14	12 (85.7)	1 (7.1)	1 (7.1)
Emergency department	12 (23.5)	16	11 (68.8)	2 (12.5)	3 (18.8)
EMS	8 (15.7)	12	8 (66.7)	1 (8.3)	3 (25.0)

*PRAMS, Pregnancy Risk Assessment Monitoring System; BRFSS, Behavioral Risk Factor Surveillance System; WIC, Women, Infants, and Children program; YRBS, Youth Risk Behavior Survey; EMS, emergency medical service.

[†]Number of jurisdictions responding to the access within 1 year question.

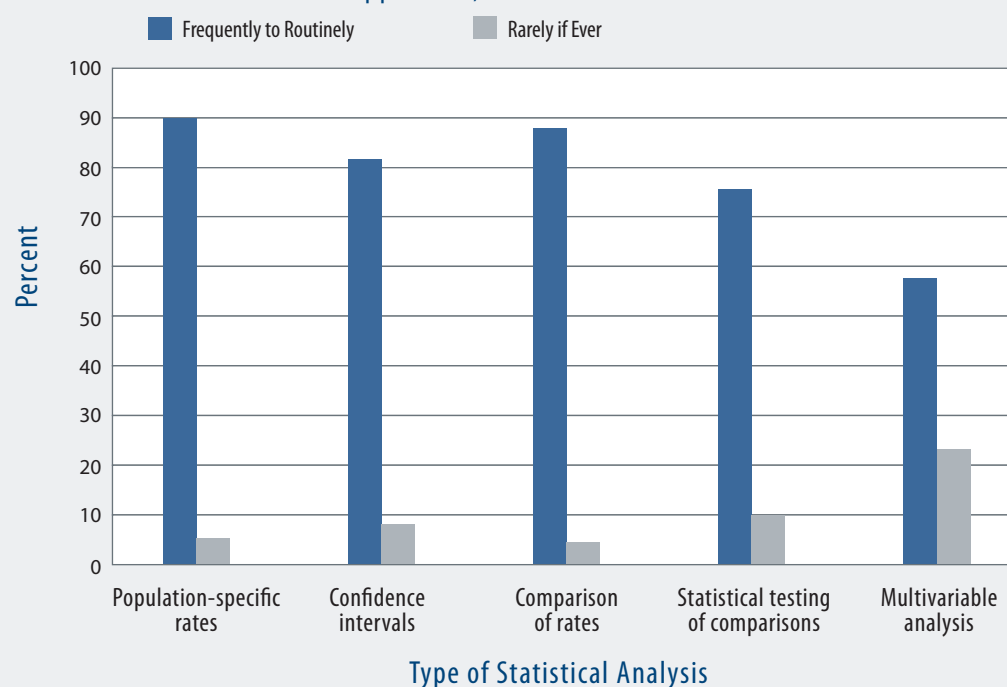
Sophistication of MCH Data Analysis by MCH Epidemiologists

MCH data lend themselves to multiple levels of analysis. MCH epidemiologists in most jurisdictions appear capable of meeting analytic needs. In 90% of jurisdictions, MCH epidemiologists frequently to routinely conduct the most basic level of analysis: calculation of population-specific rates. Rates among groups are compared in 86% of jurisdictions; statistical testing of such comparisons is done in 76%. Multivariable analysis, which requires a particularly high level of training, is frequently to routinely done in 57% of jurisdictions (Table 6, Figure 5).

Table 6. Level of sophistication of MCH data analysis by MCH epidemiologists—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

TYPE OF DATA ANALYSIS	MCH EPIDEMIOLOGISTS PERFORM GIVEN TYPE OF ANALYSIS				
	ROUTINE	FREQUENT	INFREQUENT	RARE	NEVER
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Population-specific rates	39 (76.5)	7 (13.7)	2 (3.9)	1 (2.0)	2 (3.9)
Confidence intervals	28 (54.9)	14 (27.5)	5 (9.8)	2 (3.9)	2 (3.9)
Comparison with other rates	31 (60.8)	13 (25.5)	4 (7.8)	1 (2.0)	2 (3.9)
Statistical testing of comparisons	22 (43.1)	17 (33.3)	7 (13.7)	3 (5.9)	2 (3.9)
Multivariable analysis	12 (23.5)	17 (33.3)	10 (19.6)	10 (19.6)	2 (3.9)

Figure 5. Percentage of jurisdictions that frequently to routinely and rarely-if-ever perform different levels of statistical analysis of MCH data—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia



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Public Availability of Data

State MCH programs were asked whether they have a publicly accessible, interactive, online query system for vital records and related health data that allows for user-defined queries and may include statistical analyses. A total of 20 (39%) responded that they have such a system.

Collaborations of MCH Epidemiologists

The span of MCH activities potentially involves a wide range of health problems well beyond the perinatal period when mothers and children's health are directly intertwined. The MCH supplement examined the frequency of collaboration between MCH epidemiologists and staff in other state program areas. The span of programs with which MCH epidemiologists collaborate is wide and varies substantially from jurisdiction to jurisdiction. Within program areas that are traditionally MCH-related, frequent-to-routine collaboration was highest for Title V (96% of jurisdictions) and lowest for Women, Infants, and Children programs (WIC) (55%). For program areas outside the traditional MCH realm, frequent-to-routine collaboration was highest for oral health (59%), chronic diseases (63%), and injury (53%). Although maternal substance abuse, mental health, and occupational setting are potentially important during pregnancy, frequent-to-routine collaboration in these areas was unusual occurring in only 22%, 12%, and 8% of jurisdictions, respectively (Table 7, Figure 6).

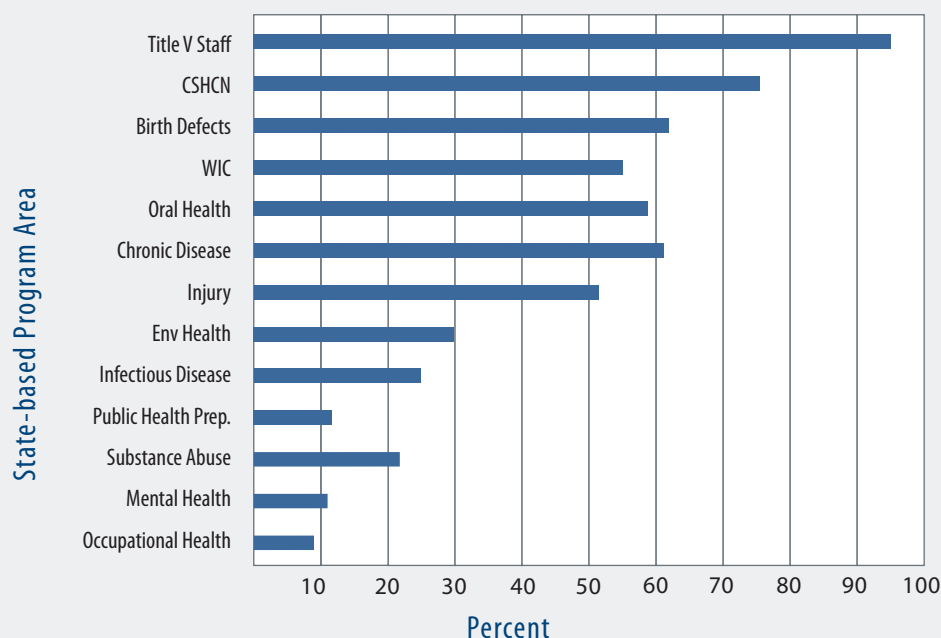
Table 7. **Frequency of collaboration between MCH epidemiologists and staff in other state program areas—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

PROGRAM AREA	FREQUENCY OF COLLABORATION			
	ROUTINELY	FREQUENTLY	INFREQUENTLY	RARELY/NEVER
	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Title V staff	48 (94.1)	1 (2.0)	1 (2.0)	1 (2.0)
Title V director	44 (86.3)	4 (7.8)	2 (3.9)	1 (2.0)
Title V director for CSHCN*	25 (49.0)	12 (23.5)	11 (21.6)	3 (5.9)
Birth defects	25 (49.0)	7 (13.7)	10 (19.6)	9 (17.7)
CSHCN staff	24 (47.1)	15 (29.4)	10 (19.6)	2 (3.9)
WIC staff	17 (33.3)	11 (21.6)	18 (35.3)	5 (9.8)
Oral health	13 (25.5)	17 (33.3)	12 (23.5)	9 (17.7)
Chronic diseases	12 (23.5)	20 (39.2)	13 (25.5)	6 (11.8)
Injury	9 (17.7)	18 (35.3)	12 (23.5)	12 (23.5)
Environmental health	4 (7.8)	11 (21.6)	17 (33.3)	19 (37.2)
Infectious diseases	4 (7.8)	9 (17.7)	23 (45.1)	15 (29.4)
Public health preparedness	3 (5.9)	4 (7.8)	20 (39.2)	24 (47.1)
Substance abuse	2 (3.9)	9 (17.7)	16 (31.4)	24 (47.1)
Mental health	2 (3.9)	4 (7.8)	17 (33.3)	28 (54.9)
Occupational health	0	4 (7.8)	12 (23.5)	35 (68.6)
Other†	—	—	—	—

*CSHCN, children with special health-care needs; WIC, Women, Infants, and Children program.

†Includes: Immunization, Medicaid (2), newborn screening, laboratory, genomics, reproductive health, tobacco use prevention, vital statistics (4). Most jurisdictions reported frequent-to-routine contact.

Figure 6. Percentage of jurisdictions in which MCH epidemiologists collaborate frequently to routinely with staff in selected state-based program areas*—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia



*CSHCN, children with special health-care needs; WIC, Women, Infants, and Children program.

MCH epidemiologists also need to collaborate with staff in agencies outside the state that have an interest in MCH and/or may deliver MCH-related services, including researchers, federal funding agencies, and nongovernmental organizations (NGOs). Most jurisdictions collaborate with staff in each of the four types of agency asked about, headed by federal agencies (84%), schools of public health (61%), NGOs (59%), and other academic institutions (55%) (Table 8).

Table 8. Frequency of collaboration between MCH epidemiologists and staff in outside agencies—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

AGENCY	FREQUENCY OF COLLABORATION			
	ROUTINE	FREQUENT	INFREQUENT	RARELY/NEVER
	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Schools of public health	14 (27.5)	17 (33.3)	11 (21.6)	9 (17.7)
Other academic institutions	13 (25.5)	15 (29.4)	12 (23.5)	11 (21.6)
Federal government organizations (e.g., CDC, HRSA)	26 (51.0)	17 (33.3)	5 (9.8)	3 (5.9)
Non-governmental organizations	12 (23.5)	18 (35.3)	14 (27.5)	7 (13.7)
Other*	—	—	—	—

*Community action agency, local health (2), MCH consortia, private-care providers, pediatric association, Society of Assisted Reproductive Technology, tribal organizations. Respondents were split equally between frequent and infrequent contact with agencies in this category.

RESULTS

Spectrum of Work in Past 12 Months

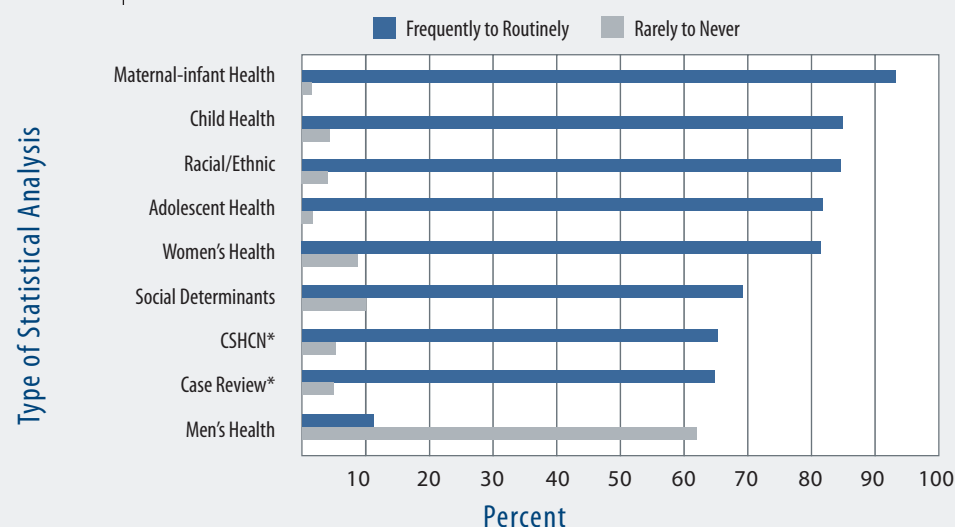
Each jurisdiction was asked how frequently its MCH epidemiologists worked in nine selected health areas in the past 12 months. In most (>64%), MCH epidemiologists frequently to routinely worked in all but one area: men's health (12%). Men's health did not appear to be a priority or a component for most MCH programs. In 63% of jurisdictions, MCH epidemiologists rarely to never spent any time in this area. Areas in which MCH epidemiologists frequently to routinely spent their time in at least 80% of jurisdictions were maternal infant health (94%), child health (86%), racial/ethnic disparities (86%), adolescent health (82%) and women's health (82%). Of interest given the growing emphasis on disparities and socioeconomic determinants of health, in 69% of jurisdictions MCH epidemiologists frequently to routinely worked on social determinants of health (Table 9, Figure 7).

Table 9. **Nature and frequency of MCH-related work in which MCH epidemiologists were involved in past 12 months—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

WORK AREA	FREQUENCY WITH WHICH CONDUCTED			
	ROUTINELY	FREQUENTLY	INFREQUENTLY	RARELY/NEVER
	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Maternal/infant health	41 (80.4)	7 (13.7)	2 (3.9)	1 (2.0)
Child health	31 (60.8)	13 (25.5)	5 (9.8)	2 (3.9)
Women's health	30 (58.8)	12 (23.5)	5 (9.8)	4 (7.8)
Racial/ethnic disparities	27 (52.9)	17 (33.3)	5 (9.8)	2 (3.9)
Adolescent health	26 (51.0)	16 (31.4)	8 (15.7)	1 (2.0)
Social determinants of health/access to care/health quality	23 (45.1)	12 (23.5)	11 (21.6)	5 (9.8)
Case reviews*	20 (39.2)	13 (25.5)	9 (17.7)	9 (17.7)
Children with special health-care needs	18 (35.3)	15 (29.4)	15 (29.4)	3 (5.9)
Men's health	2 (3.9)	4 (7.8)	13 (25.5)	32 (62.7)

*Case reviews may include fetal, infant, child, and maternal death reviews.

Figure 7. Percentage of jurisdictions in which MCH epidemiologists frequently to routinely and rarely to never worked in selected health areas in the past 12 months, May 2008–April 2009—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

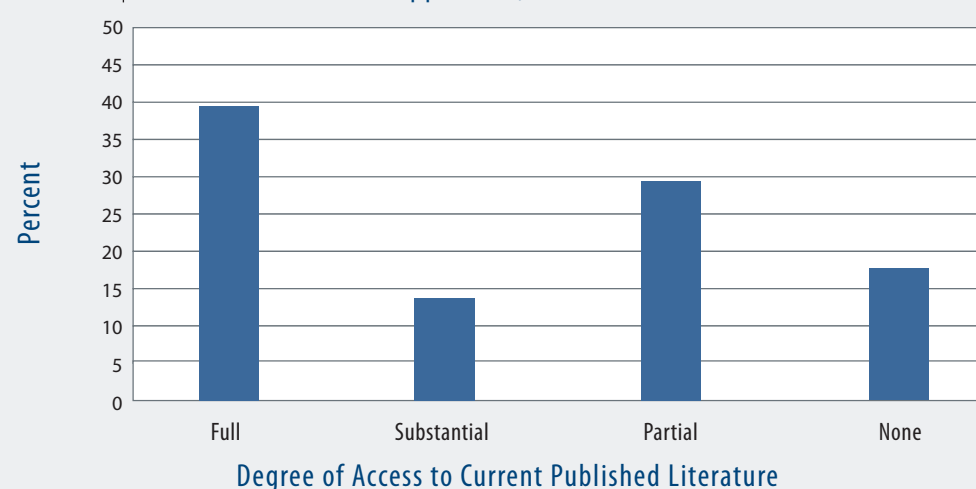


*CSHCN, children with special health-care needs.
Case reviews may include fetal, infant, child, and maternal death reviews.

Access to Published Literature

MCH epidemiologists need ready access to the full-text medical, epidemiologic, and public health literature. Ready access is defined as 0–3 days return by electronic or hard copy after submission of a request. In 20 (39%) jurisdictions, MCH epidemiologists have full access; in seven (14%), substantial access (>25 journals but not full access); in 15 (29%), partial access (<25 journals); and in nine (18%), no access (Figure 8).

Figure 8. Percentage of jurisdictions with full, substantial, partial, or no access to the current medical, epidemiologic, and public health literature—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia



RESULTS

MCH Epidemiology Workforce

Several questions on the 2009 core ECA provided data to characterize the MCH epidemiology workforce. A total of 292 individual epidemiologists representing 147 FTEs (two half-time positions equal one FTE) MCH epidemiologists completed individual worksheets showing their level of academic achievement and their level of epidemiology training. The exact number of MCH epidemiologist FTEs working in state health departments in 2009 is unknown because only 70% of all epidemiologists completed individual worksheets, and response rates by topic area are unknown. A total of 93% had master's level or higher degrees (Table 10). Of the 62.5 epidemiologists with doctoral-level degrees, 49.5 had PhD or DrPH degrees, and 13 had medical, dental, or veterinary medicine degrees.

Table 10. **Academic training of persons* working as MCH epidemiologists in state health departments, by level of academic training—2009 Epidemiology Capacity Assessment**

LEVEL OF ACADEMIC TRAINING	NO. (%) FULL-TIME EQUIVALENTS
MD, DO, DDS	11.5 (7.8)
DVM	1.5 (1.0)
PhD, DrPH, other doctoral	49.5 (33.7)
MPH, MSPH, other master's	73.5 (50.0)
RN, other nursing	0
BA, BS, other bachelor's	11 (7.5)
Associate or no post-high school degree	0
TOTAL	147 (100)

**Persons are expressed as full-time equivalent positions, resulting in fractions of persons whose positions are split between ≥ 2 program areas or are less than full-time.*

When examined by level of epidemiology-specific training, 56% FTEs had a master's or higher degree (Table 11). The largest single group was those with master's-level epidemiology training, accounting for 30% of the total; 15% had no specific epidemiology training except that acquired on the job.

MCH epidemiologists were more likely than other epidemiologists working in state health departments to have PhD-level epidemiology training (16.0% vs. 6.9%, $p < 0.001$) (data from 2009 core ECA and Table 11).

Table 11. **Epidemiology training of persons* working as MCH epidemiologists in state health departments, by level of epidemiology training—2009 Epidemiology Capacity Assessment**

HIGHEST LEVEL OF EPIDEMIOLOGY TRAINING [†]	NO. (%) FULL-TIME EQUIVALENTS
PhD, DrPH, other doctoral degree in epidemiology	23.5 (16.0)
Professional background (e.g., MD, DO, DVM, DDS) with a dual degree in epidemiology	12.5 (8.5)
MPH, MSPH, other master's degree in epidemiology	44 (29.9)
BA, BS, other bachelor's degree in epidemiology	1 (0.7)
Completed formal training program in epidemiology (e.g., EIS)	8.5 (5.8)
Completed some coursework in epidemiology	36 (24.5)
Received on-the-job training in epidemiology	18.5 (12.6)
No formal training in epidemiology (i.e., epidemiologist does not fit in any of the above categories)	3 (2.0)
TOTAL	147 (100)

*Persons are expressed as full-time equivalent positions, resulting in fractions of persons whose positions are split between ≥ 2 program areas or are less than full-time.

[†]Training level is hierarchical with the highest level of epidemiology-specific training being the relevant category. For example, a physician completing EIS who has a master's degree in epidemiology is listed as being an "MD + Master's," not "EIS or other formal program." EIS, Epidemic Intelligence Service.

Staff Turnover, Retirement, and Retention

The core ECA contained a measure of experience and anticipated turnover. For this analysis, data were examined from all 292 MCH epidemiologists comprising 147 FTEs who completed the individual worksheets. Approximately 34% of MCH epidemiologists had at least 5 years' experience, with those with master's-level training having the highest percentage of this level of experience of those with higher-level degrees. Nearly 15% planned to retire or change careers out of epidemiology in the next 5 years, with no difference by academic training level. MCH epidemiologists were similar to other epidemiologists in intent to retire or change careers in the next 5 years.

RESULTS

Table 12. Turnover of MCH epidemiology workforce in 2008 and projected in next 5 years—2009 Epidemiology Capacity Assessment

EPIDEMIOLOGISTS PLANNING TO RETIRE OR CHANGE CAREERS IN NEXT 5 YEARS, BY DEGREE	TOTAL	NO. (%) WITH ≥5 YEARS' EXPERIENCE	NO. (%) OF TOTAL RETIRING OR CHANGING CAREER IN NEXT 5 YEARS
MD, DO, DDS	34	1 (2.9)	5 (14.7)
DVM	3	1 (33.3)	0
PhD, DrPH, other doctoral	89	19 (21.3)	12 (13.5)
MPH, MSPH, other master's	145	65 (44.8)	19 (13.1)
RN, other nursing	1	1 (100)	1 (100)
BA, BS, other bachelor's	19	11 (57.9)	6 (31.6)
Associate or no post-high school degree	1	1 (100)	0
TOTAL	292	99 (33.9)	43 (14.7)

Relationship between Selected Measures of Epidemiologic Capacity, Capacity-building Initiatives and Organizational Structure, and Desired MCH Epidemiology Processes and Outcomes

A number of analyses were conducted to examine the association between measures of MCH epidemiology capacity and selected program activities thought to reflect higher levels of epidemiology capacity, and between key MCH program organizational milestones used to measure progress and the same selected program activities.

Relationship of Overall Epidemiology and Surveillance Capacity to Capacity to Provide Selected Public Health Services

In several analyses, the meaning of the measure of “overall epidemiology and surveillance capacity” was examined: Does it correlate with more specific capacities? Does it correlate with several objectives to be reached by all jurisdictions: having MCH leaders have scientific as well as administrative authority; having at least one doctoral-level MCH epidemiologist in each jurisdiction?

Having at least substantial epidemiology and surveillance capacity was positively associated with all six public health services examined but was significant for only one (monitoring health status) (Table 13).

Table 13. Association between overall MCH epidemiology and surveillance capacity to MCH epidemiology capacity to provide selected public health services—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

SELECTED PUBLIC HEALTH SERVICE	LEVEL OF CAPACITY TO PROVIDE SELECTED PUBLIC HEALTH SERVICE	NO. JURISDICTIONS WITH OVERALL EPIDEMIOLOGY AND SURVEILLANCE CAPACITY		OR* (P VALUE)
		SUBSTANTIAL-FULL	NONE-PARTIAL	
Monitor health status to identify community health problems	Substantial–full	24	14	3.86 (0.04)
	None–partial	4	9	
Diagnose and investigate health problems in the community	Substantial–full	18	10	2.34 (NS)
	None–partial	10	13	
Evaluate effectiveness accessibility and quality of personal and population-based health services	Substantial–full	11	8	1.21 (NS)
	None–partial	17	15	
Research for new insights and innovative solutions to health problems	Substantial–full	10	7	1.27 (NS)
	None–partial	18	16	
Linkage of data systems that can facilitate high-level epidemiologic analysis	Substantial–full	18	10	2.34 (NS)
	None–partial	10	13	
Translate analytic findings into information directly usable to decision-makers	Substantial–full	22	13	2.82 (0.09)
	None–partial	6	10	

*Probability of jurisdictions reporting at least substantial overall MCH epidemiology and surveillance capacity to also have at least substantial capacity for the given public health service, compared with jurisdictions reporting less overall MCH epidemiology and surveillance capacity. OR, odds ratio; NS, not statistically significant; S, statistically notable, $p < 0.10$.

RESULTS

Relationship between Selected Measures of Epidemiologic Capacity, Capacity-building Initiatives and Organizational Structure, and Desired MCH Epidemiology Processes and Outcomes

There was a positive, but not significant, relationship between a jurisdiction having at least substantial overall MCH epidemiology and surveillance capacity and each of several milestones highlighted in CSTE position statements for building MCH epidemiology capacity including 1) having MCH leaders with scientific and administrative authority (vs. administrative authority only or neither) and 2) having at least one doctoral-level MCH epidemiologist. However, associations were stronger between having at least substantial epidemiology capacity and having a lead MCH epidemiologist (OR 3.65, $p = 0.08$) and having an MCH epidemiology unit located within an MCH program (OR 4.67, $p = 0.01$) (Table 14).

Table 14. **Association between substantial-to-full overall MCH epidemiology and surveillance capacity and type of MCH epidemiology organizational structure or developmental milestones – 2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

MCH EPIDEMIOLOGY STRUCTURE/ MILESTONES SUBSTANTIAL-FULL		OVERALL EPIDEMIOLOGY AND SURVEILLANCE CAPACITY		OR* (P VALUE)
		SUBSTANTIAL-FULL	NONE-PARTIAL	
Lead MCH epidemiologist	Yes	25	16	3.65 (0.08)
	No	3	7	
Full-time primary MCH epidemiologist	Yes	19	12	1.94 (NS)
	No	9	11	
MCH epidemiologists scattered in MCH programs	Yes	13	7	1.98 (NS)
	No	15	16	
MCH epidemiology unit within an MCH program	Yes	21	9	4.67 (0.01)
	No	7	14	
MCH epidemiology unit in a larger epidemiology structure	Yes	5	8	0.41 (NS)
	No	23	15	
MCH leader with scientific and administrative or scientific authority	Yes	15	12	1.06 (NS)
	No	13	11	
Doctoral-level MCH epidemiologist	Yes	15	8	2.16 (NS)
	No	13	15	

* OR, odds ratio. OR = the probability that jurisdictions with substantial-to-full overall epidemiology and surveillance capacity have the particular epidemiology structure.

The specific MCH epidemiologic service capacities (Table 13) that correlated with overall epidemiology and surveillance capacity were examined to determine whether they were associated with the desired level of involvement of MCH epidemiologists in various MCH program decision-making activities, with ready access to data, and with more regularly performing broader-level epidemiologic activities. Jurisdictions that had at least substantial MCH epidemiology capacity to monitor health status to identify community health problems were much more likely than those with less capacity to participate in the spectrum of decision-making activities that should be data-driven, such as priority setting (OR 8.53) and program planning (OR 5.16) (Table 15). They were also significantly more likely ($p < 0.05$) to calculate confidence intervals, conduct multivariable analysis, and collaborate with others on work related to social determinants of health and health-care access. They were not more likely to have unfettered access to key MCH data sets.

Table 15. Association between MCH epidemiology capacity to monitor health status and MCH epidemiologists being involved in MCH program decision making, having ready data access, and performing broader epidemiologic activities—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

DESIRED MCH EPIDEMIOLOGIST INVOLVEMENT/PERFORMING SELECTED EPIDEMIOLOGY ACTIVITIES	LEVEL OF DESIRED ABILITY/OUTCOME	CAPACITY TO MONITOR HEALTH STATUS		OR* (P VALUE)
		SUBSTANTIAL-FULL	NONE-PARTIAL	
Participate in decision making, re: needs assessment	Substantial-full	35	7	10.00 (<0.01)
	None-partial	3	6	
Participate in decision making, re: priority setting	Substantial-full	32	5	8.53 (<0.01)
	None-partial	6	8	
Participate in decision making, re: program planning	Substantial-full	29	5	5.16 (<0.02)
	None-partial	9	8	
Participate in decision making, re: performance measurement	Substantial-full	31	3	14.76 (<0.001)
	None-partial	7	10	
Have unfettered access to all the following: birth certificate data, death certificate data, PRAMS data, and BRFSS data	Yes	17	5	1.30 (NS)
	No	21	8	
Calculate confidence intervals	Yes	38	11	Undefined (0.01)
	No	0	2	
Conduct multivariable analysis	Yes	38	11	Undefined (0.01)
	No	0	2	
In last 12 months, collaborated on work, re: social determinants of health	Frequently-routinely	29	6	3.76 (0.05)
	Never-infrequently	9	7	

*OR, odds ratio; NS, nonsignificant. OR = the probability that jurisdictions with at least substantial MCH epidemiology capacity to monitor health status have MCH epidemiologists with higher levels of participation in program decision making, ready data access, and more in-depth epidemiologic activities than do jurisdictions with less MCH capacity.

RESULTS

Jurisdictions with at least substantial MCH capacity to evaluate effectiveness, accessibility, and quality of personal and population-based health services were much more likely than those with less capacity to participate in the spectrum of MCH program decision-making activities that should be data-driven, such as priority setting (OR undefined), program evaluation (OR 18.70) and policy development (OR 4.13) (Table 16). Although they appeared more likely to have unfettered access to key MCH data sets, the relationship was not statistically significant (OR 2.63, $p = 0.10$).

Table 16. **Association between MCH capacity to evaluate effectiveness, accessibility, and quality of personal and population-based health services and MCH epidemiologists being involved in MCH program decision making and having ready access to available essential data sets—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

DESIRED MCH EPIDEMIOLOGIST INVOLVEMENT/ACCESS TO DATA	LEVEL OF DESIRED ABILITY/OUTCOME	CAPACITY TO EVALUATE EFFECTIVENESS		OR* (P VALUE)
		SUBSTANTIAL–FULL	NONE–PARTIAL	
Participate in decision making, re: priority setting	Substantial–full	19	18	Undefined (<0.001)
	None–partial	0	14	
Participate in decision making, re: program planning	Substantial–full	19	15	Undefined (0.0001)
	None–partial	0	17	
Participate in decision making, re: program evaluation	Substantial–full	17	10	18.70 (<0.0001)
	None–partial	2	22	
Participate in decision making, re: policy development	Substantial–full	11	8	4.13 (0.02)
	None–partial	8	24	
Have unfettered access to all the following: birth certificate data, death certificate data, PRAMS data, and BRFSS data [†]	Yes	11	11	2.63 (0.10)
	No	8	21	

*OR, odds ratio. OR = the probability that jurisdictions with at least substantial MCH capacity to evaluate effectiveness have MCH epidemiologists with higher levels of participation in MCH program decision making and ready access to essential data than do jurisdictions with less capacity.

[†]PRAMS, Pregnancy Risk Assessment Monitoring System; BRFSS, Behavioral Risk Factor Surveillance System.

Jurisdictions with at least substantial MCH capacity to conduct research for new insights and innovative solutions to health problems were much more likely than those with less capacity to participate in the spectrum of MCH program decision-making activities that should be data-driven, such as priority setting (OR 9.90), program planning (OR 14.22), and policy development (OR 3.97) (Table 17). Although they were also more likely to collaborate with a variety of potential research partners, such as schools of public health, government agencies, and selected other public health programs (ORs between 1.61–2.89), none of the relationships were statistically significant.

Table 17. **Association between MCH capacity to research for new insights and innovative solutions to health problems and MCH epidemiologists being involved in MCH program decision making and collaborating with selected partners of importance for research and innovative solutions—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

DESIRED MCH EPIDEMIOLOGIST INVOLVEMENT/COLLABORATIONS	LEVEL OF DESIRED ABILITY/OUTCOME	CAPACITY TO CONDUCT RESEARCH FOR NEW INSIGHTS		OR* (P VALUE)
		SUBSTANTIAL-FULL	NONE-PARTIAL	
Participate in decision making, re: priority setting	Substantial–full	16	21	9.90 (0.02)
	None–partial	1	13	
Participate in decision making, re: program planning	Substantial–full	16	18	14.22 (<0.01)
	None–partial	1	16	
Participate in decision making, re: policy development	Substantial–full	10	9	3.97 (0.03)
	None–partial	7	25	
Collaborate with mental health	Frequently–routinely	3	3	2.21 (NS)
	Never–infrequently	14	31	
Collaborate with substance abuse	Frequently–routinely	5	6	1.94 (NS)
	Never–infrequently	12	28	
Collaborate with schools of public health	Frequently–routinely	13	18	2.89 (NS)
	Never–infrequently	4	16	
Collaborate with government organizations	Frequently–routinely	15	28	1.61 (NS)
	Never–infrequently	2	6	

*OR, odds ratio; NS, nonsignificant. OR = the probability that jurisdictions with at least substantial MCH capacity to conduct research for new insights and innovative solutions have MCH epidemiologists with higher levels of participation in program decision making and important collaborative relationships than do jurisdictions with less capacity.

RESULTS

Jurisdictions with at least substantial MCH capacity to translate analytic findings into information directly usable to decision-makers were much more likely than those with less capacity to participate in the spectrum of MCH program decision-making activities that should be data-driven, such as needs assessment (OR 34.00), priority setting (OR 7.71), and policy development (OR undefined) (Table 18). Although they were also more likely to participate in program planning decisions, this relationship was not statistically significant (OR 2.89, $p = 0.09$).

Table 18. **Association between capacity to translate analytic findings into information that can be directly useful to others and MCH epidemiologists being involved in MCH program decision making—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

DESIRED MCH EPIDEMIOLOGIST INVOLVEMENT	LEVEL OF DESIRED ABILITY/OUTCOME	CAPACITY TO TRANSLATE ANALYTIC FINDINGS		OR* (P VALUE)
		SUBSTANTIAL-FULL	NONE-PARTIAL	
Participate in decision making, re: needs assessment	Substantial-full	34	8	34.00 (<0.0001)
	None-partial	1	8	
Participate in decision making, re: priority setting	Substantial-full	30	7	7.71 (<0.01)
	None-partial	5	9	
Participate in decision making, re: program planning	Substantial-full	26	8	2.89 (0.09)
	None-partial	9	8	
Participate in decision making, re: policy development	Substantial-full	19	0	Undefined (<0.001)
	None-partial	16	16	

*OR, odds ratio. OR = the probability that jurisdictions with at least substantial MCH epidemiology capacity to translate analytic findings into information that can be directly useful to others have MCH epidemiologists with higher levels of participation in program decision making than do jurisdictions with less capacity.

The relationships between several MCH epidemiology capacity-building milestones to a variety of other markers of MCH epidemiology were examined. The milestones were the type of authority of MCH leaders (scientific and administrative vs. scientific only, administrative only, or neither) and whether the jurisdiction had at least one doctoral-level MCH epidemiologist.

Jurisdictions with one or more MCH leaders who have scientific and administrative authority were more likely than those without that authority to have epidemiology capacity to evaluate program effectiveness (OR 3.61), participate in MCH program decision making for needs assessment (OR undefined) and priority setting (OR 3.28), have unfettered access to selected MCH data sets (i.e., WIC, newborn screening, family planning, and abortion data), and have published at least one peer-reviewed article in the preceding year (OR 5.81) (Table 19). Although none were statistically significant at the $p = 0.05$ level, for each other marker of epidemiology capacity examined, there was a positive association (ORs 1.19–undefined).

Table 19. Association between type of authority of MCH leaders and selected markers of epidemiology capacity—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

MARKERS OF EPIDEMIOLOGY CAPACITY	LEVEL OF EPIDEMIOLOGY CAPACITY	TYPE OF AUTHORITY OF MCH LEADERS		OR* (P VALUE)
		BOTH SCIENTIFIC AND ADMIN OR SCIENTIFIC ONLY	ADMIN ONLY OR NEITHER	
Evaluate effectiveness, accessibility, and quality of personal and population-based health services	Substantial–full	13	6	3.61 (0.03)
	None–partial	12	20	
Research for new insights and innovative solutions to health problems	Substantial–full	11	6	2.62 (NS)
	None–partial	14	20	
Participate in decision making, re: needs assessment	Substantial–full	25	17	Undefined (0.001)
	None–partial	0	9	
Participate in decision making, re: priority setting	Substantial–full	21	16	3.28 (0.08)
	None–partial	4	10	
Participate in decision making, re: program planning	Substantial–full	19	15	2.32 (NS)
	None–partial	6	11	
Participate in decision making, re: policy development	Substantial–full	12	7	1.19 (NS)
	None–partial	13	9	
Have unfettered access to all the following: birth certificate data, death certificate data, PRAMS [†] data, and BRFSS data	Yes	13	9	2.29 (NS)
	No	12	19	
Have unfettered access to all the following: WIC, newborn screening, family planning, and abortion data	Yes	6	1	7.89 (0.04)
	No	19	25	
Calculate confidence intervals	Yes	25	24	Undefined (NS)
	No	0	2	
Conduct multivariable analysis	Yes	25	24	Undefined (NS)
	No	0	2	
Collaborate with mental health	Frequently–routinely	4	2	2.29 (NS)
	Never–infrequently	21	24	
Collaborate with substance abuse	Frequently–routinely	6	5	1.33 (NS)
	Never–infrequently	19	21	
Collaborate with WIC	Frequently–routinely	16	12	2.07 (NS)
	Never–infrequently	9	14	
Collaborate with oral health	Frequently–routinely	16	14	1.52 (NS)
	Never–infrequently	9	12	

Continued on following page.

RESULTS

Table 19. *continued* Association between type of authority of MCH leaders and selected markers of epidemiology capacity—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

MARKERS OF EPIDEMIOLOGY CAPACITY	LEVEL OF EPIDEMIOLOGY CAPACITY	TYPE OF AUTHORITY OF MCH LEADERS		OR* (P VALUE)
		BOTH SCIENTIFIC AND ADMIN OR SCIENTIFIC ONLY	ADMIN ONLY OR NEITHER	
Published at least one peer reviewed article	Yes	11	4	5.81 (0.01)
	No	9	19	
Had at least one abstract at national meeting	Yes	15	12	2.75 (NS)
	No	5	11	
Published at least one “other” report	Yes	13	11	2.03 (NS)
	No	7	12	

*OR, odds ratio; NS, nonsignificant. OR = the probability that jurisdictions with MCH leaders who have both administrative and scientific authority more have selected markers of MCH epidemiology capacity than do jurisdictions with MCH leaders who have administrative authority only or neither administrative or scientific authority.

†PRAMS, Pregnancy Risk Assessment Monitoring System; BRFSS, Behavioral Risk Factor Surveillance System; WIC, Women, Infants, and Children program.

There were fewer strong associations with markers of epidemiology capacity in jurisdictions with at least one doctoral-level MCH epidemiologist, compared with none for type of authority of MCH epidemiologists. Those having at least one doctoral-level epidemiologist were more likely than those without to have had an abstract accepted at a national meeting in the past year (OR 10.18) (Table 20). Although there were relatively strong associations with having published at least one report in the past year (OR 3.31, $p = 0.07$); participating in decision making, re: needs assessment (OR 3.50, $p = 0.13$); and collaborating with WIC (OR 3.05, $p = 0.06$), none were statistically significant, and the measures of association with all other markers were smaller and often <1 .

Table 20. Association between having a doctoral-level epidemiologist and selected markers of epidemiology capacity—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia

MARKERS OF EPIDEMIOLOGY CAPACITY	LEVEL OF EPIDEMIOLOGY CAPACITY	HAVE A DOCTORAL LEVEL EPIDEMIOLOGIST		OR* (P VALUE)
		PAST OR PRESENT	NEVER	
Evaluate effectiveness	Substantial–full	10	13	1.62 (NS)
	None–partial	9	19	
Research for new insights,	Substantial–full	7	10	0.79 (NS)
	None–partial	16	18	
Participate in decision making, re: needs assessment	Substantial–full	21	21	3.50 (NS)
	None–partial	2	7	

Continued on following page.

Table 20.
*continued***Association between having a doctoral-level epidemiologist and selected markers of epidemiology capacity—2009 Maternal and Child Health ECA Supplement, 50 states and District of Columbia**

MARKERS OF EPIDEMIOLOGY CAPACITY	LEVEL OF EPIDEMIOLOGY CAPACITY	HAVE A DOCTORAL LEVEL EPIDEMIOLOGIST		OR* (P VALUE)
		PAST OR PRESENT	NEVER	
Participate in decision making, re: priority setting	Substantial–full	19	18	2.64 (NS)
	None–partial	4	10	
Participate in decision making, re: program planning	Substantial–full	18	16	2.70 (NS)
	None–partial	5	12	
Participate in decision making, re: policy development	Substantial–full	10	9	1.62 (NS)
	None–partial	13	19	
Have unfettered access to all the following: birth certificate data, death certificate data, PRAMS [†] data and BRFSS data	Yes	11	11	0.44 (NS)
	No	12	17	
Have unfettered access to all the following: WIC, newborn screening, family planning, and abortion data	Yes	3	4	0.83 (NS)
	No	20	24	
Calculate confidence intervals	Yes	22	27	0.81 (NS)
	No	1	1	
Conduct multivariable analysis	Yes	22	27	0.81 (NS)
	No	1	1	
Collaborate with mental health	Frequently–routinely	4	2	2.74 (NS)
	Never–infrequently	19	26	
Collaborate with substance abuse	Frequently–routinely	7	4	1.17 (NS)
	Never–infrequently	24	16	
Collaborate with WIC	Frequently–routinely	16	12	3.05 (0.06)
	Never–infrequently	7	16	
Collaborate with oral health	Frequently–routinely	14	16	1.17 (NS)
	Never–infrequently	9	12	
Published at least one peer reviewed article	Yes	8	7	2.06 (NS)
	No	10	18	
Had at least one abstract at national meeting	Yes	16	11	10.18 (0.003)
	No	2	14	
Published at least one “other” report	Yes	13	11	3.31 (0.07)
	No	5	14	

*OR, odds ratio; NS, nonsignificant. OR = the probability that jurisdictions with an epidemiologist who has doctoral-level training have epidemiologists who have higher levels of participation in program decision making, have ready data access, and perform broader epidemiologic activities than do jurisdictions that do not have an epidemiologist who has doctoral-level training.

[†]PRAMS, Pregnancy Risk Assessment Monitoring System; BRFSS, Behavioral Risk Factor Surveillance System; WIC, Women, Infants, and Children program.

DISCUSSION



DISCUSSION

MCH is the one program area in which overall state-level epidemiology and surveillance capacity increased progressively from 2004 to 2009, bucking the trend of an overall decrease in state-level epidemiology capacity. The MCHS did not attempt to measure all possible reasons for an increase, most notably, whether resources and/or number of FTE MCH epidemiologists increased. However, it did collect data that suggest that programs that have adopted some or all of three key features of the recommended ideal MCH program structure have a higher level of epidemiology functioning than those that have not. These features include having MCH epidemiologists grouped together in a unit, having epidemiologists have both scientific and administrative leadership roles, and having at least one doctoral-level MCH epidemiologist. Underlying these developments are a long series of CDC, HRSA, CSTE and AMCHP efforts to strengthen MCH epidemiologic leadership and to develop state-level standards and milestones for MCH epidemiology capacity development. Since the late 1980s, both MCH and chronic disease epidemiologists have formed workgroups, developed plans and progress measures, and worked toward these. It is no surprise that they are two of the best-developed program areas in terms of epidemiology capacity other than infectious diseases, now with >50% of jurisdictions reporting at least substantial capacity. The process they have undergone should be a lesson for developing higher-level epidemiology capacity in other underdeveloped program areas.

Involvement of MCH epidemiologists and the data they bring to critical program-level decision making is essential to development of fully effective MCH programs. Higher levels of MCH epidemiology capacity in this assessment were closely linked to higher levels of involvement of epidemiologists in decision making. In one area, however, MCH epidemiologists in most jurisdictions still are not very involved—program policy decisions—a serious gap. Given that additional staff was identified as the key ingredient needed to having more capacity, additional investment in MCH epidemiologists is needed if the full potential of MCH programs to improve maternal and child health is to be close to fully realized.

Ready access to key data sources potentially available at the state level is important for MCH epidemiologists. If one cannot have free access to essential data, problems cannot be fully described, and efforts to remediate them cannot be well assessed. Although MCH epidemiologists in most jurisdictions have access to the most basic data sets, most lack unfettered access to such important data sets as hospital discharges, WIC, family planning, abortion, Youth Risk Behavior Survey, Medicaid, and emergency department visits. Barriers to full access to these data sets and means to overcome them need to be identified. Given that some jurisdictions have unfettered access to these data, identifying key barriers and steps to overcoming them should be possible.

Training programs including CDC assigning well-qualified MCH epidemiologists to state health departments and CDC/CSTE fellows providing person-power in exchange for practical experience have been the backbone of MCH development. They appear to have worked well: most states now have well-qualified MCH epidemiologists who are capable of sophisticated analyses and who attend and present at national meetings. MCH epidemiology has now developed to a level in which more person-power is needed to complement the relatively well-trained leadership.

MCH depends on interaction with other program areas in which a substantial overlap exists in public health concerns. MCH epidemiologists often work with epidemiologists in chronic disease,

environmental health, injury, and oral health. They also occasionally work with epidemiologists in infectious diseases. However, they rarely work consistently with epidemiologists in substance abuse, mental health, and occupational health, perhaps in part because few state health departments have any epidemiology capacity in these areas. This gap is potentially serious because many MCH issues have large substance abuse, mental health and occupational health components.

This assessment has some notable limitations. First, as in past ECAs, information collected about perceived capacity is self-assessed data. Methods used by respondents to estimate this information most likely varied between jurisdictions and may have varied within jurisdictions over time. Second, the response rate to the individual worksheets was only 70%, and respondents might have differed from non-respondents. Furthermore, because of the less than 100% response rate to the worksheets, the numbers and percentages of jurisdictions with an epidemiologist with doctoral-level training is most likely an underestimate, and we were unable to assess trends in this index of capacity. Finally, the 2009 ECA and MCHS measured only epidemiology and MCH epidemiology capacity at the state level. Local health department–level MCH epidemiology capacity was not assessed, including local-level capacity in large city health departments serving populations as large as those in many states.

Conclusions

- MCH epidemiology and surveillance capacity continued to grow well into 2009, despite the economic downturn. The setting of MCH epidemiology milestones—including development of a centralized MCH epidemiology unit and strong leadership with both scientific and administrative authority—and achievement of the milestones in many states appear to have contributed to continued growth.
- MCH programs in most jurisdictions have substantial capacity in many areas, participate in all areas of decision making, have unfettered access to the most basic data sets, conduct sophisticated statistical analyses, and are involved in a broad spectrum of MCH activities. Their most pressing need is additional staff.
- Despite the achievements, the MCH epidemiology capacity glass is only half full: nearly half of all states lack even substantial MCH epidemiology and surveillance capacity, and in only a minority of jurisdictions do MCH epidemiologists participate substantially in policy development; have access to important data sets; and work with colleagues in substance abuse, mental health, and occupational health.

RECOMMENDATIONS



RECOMMENDATIONS

- MCH epidemiology capacity should be explicitly considered in the national dialogue about addressing the gaps identified in the core ECA in overall state-based epidemiology capacity and ensuring that states have the capacity needed to provide essential data for effective program planning, public health action, evaluation, and policy development.
- Improving capacity in states that have minimal-to-no MCH epidemiology capacity should be a priority. At a minimum, every state should have a lead MCH epidemiologist with both scientific and administrative authority to oversee and coordinate data gathering analysis, interpretation, and translation to public health practice; at least one epidemiologist with doctoral-level training; and sufficient and well-trained support staff.
- The MCH Workgroup may be a model for other program areas that need development of epidemiology and surveillance capacity (e.g., substance abuse, mental health, oral health). Establishment of working groups with CSTE, CDC, and academic representation to discuss gaps and priorities and develop initiatives and milestones, as the MCH Workgroup has done, may be a critical catalyzing step. CSTE in coordination with CDC may be able to facilitate establishment of a model.
- State MCH epidemiologists should build partnerships to collaborate with substance abuse, mental health, and occupational health epidemiologists.
- Continued monitoring, particularly of gaps in MCH epidemiology capacity, is critical to make additional progress. CSTE should continue to routinely assess state health departments about MCH epidemiology capacity, ideally every 2 years.

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REFERENCES

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2009 MATERNAL AND CHILD HEALTH EPIDEMIOLOGY CAPACITY ASSESSMENT MODULE



Enter Email: _____

Maternal and Child Health Epidemiology

1. What percentage of time per week does the primary MCHE for your local/state health department spend working on MCH activities? (50% would be 2 1/2 days per week)?

_____ (If less than 2 1/2 days/week, skip to the end)

2. Where are the majority of MCHes located?

- a. Individual MCHes are embedded within MCH-related programs or data/epidemiology units and are not predominantly located together

☐ Yes ☐ No

- b. Predominantly within an MCH program unit (Title V programs)

☐ Yes ☐ No

- c. Predominantly within a larger epidemiology or health statistics unit (unit that includes other epidemiologists and/or biostatisticians such as chronic disease or vital statistics)

☐ Yes ☐ No

- d. Other organizational arrangement in the local/state health department (please describe):

☐ Yes ☐ No

- e. In another institution or agency outside of the local/state health department (please describe):

☐ Yes ☐ No

3. Does the local/state health department have one or more MCHE leaders who, according to job title and category, have both administrative and scientific authority?

☐ Yes, both ☐ Only administrative authority ☐ Only scientific authority ☐ Neither

For questions 4 through 6, use the following scale.

NOT AT ALL, NONE	None of the activity, knowledge or resources described within the question are met.
MINIMALLY	Less than 25% (but greater than 0%) of the activity, knowledge or resources described within the question are met.
PARTIALLY	25% or greater (but less than 50%) of the activity, knowledge or resources described within the question are met.
SUBSTANTIALY	50% or greater (but less than 75%) of the activity, knowledge or resources described within the question are met.
ALMOST FULLY	75% or greater (but less than 100%) of the activity, knowledge or resources described within the question are met.
FULL	100% of the activity, knowledge or resources described within the question are met.

4. Does your local/state health department have adequate MCH epidemiologic capacity to provide the following essential public health services and related activities? (Click [HERE](#) for an entire list of Essential Public Health Services)

Monitoring health status and/or access to and utilizations of health services to identify and solve community health problems	Diagnosing and investigating health problems and health hazards affecting women, children, and youth	Evaluating effectiveness, accessibility, and quality of personal and population-based health services
☐ Not at all	☐ Not at all	☐ Not at all
☐ Minimally	☐ Minimally	☐ Minimally
☐ Partially	☐ Partially	☐ Partially
☐ Substantially	☐ Substantially	☐ Substantially
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full
Researching for new insights and innovative solutions to health problems	Promoting and contributing expertise to the linkage of data systems that can facilitate high level epidemiologic analysis	Translating analytic findings into information that can be directly useful to program and policy staff, legislators, and other decision makers
☐ Not at all	☐ Not at all	☐ Not at all
☐ Minimally	☐ Minimally	☐ Minimally
☐ Partially	☐ Partially	☐ Partially
☐ Substantially	☐ Substantially	☐ Substantially
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full

5. If you reported that your local/state health department has less than almost full capacity to provide essential MCH epidemiologic / public health services and related activities, why? (select all that apply in each category)

Monitoring health status and/or access to and utilization of health services to identify and solve community health problems	Diagnosing and investigating health problems and health hazards affecting women, children, and youth	Evaluating effectiveness, accessibility, and quality of personal and population-based health services
☐ Inadequate number of staff(FTEs)	☐ Inadequate number of staff(FTEs)	☐ Inadequate number of staff(FTEs)
☐ Staff with inadequate skills or training	☐ Staff with inadequate skills or training	☐ Staff with inadequate skills or training
☐ Inadequate data resources	☐ Inadequate data resources	☐ Inadequate data resources
☐ Outdated or lack of appropriate analytic software	☐ Outdated or lack of appropriate analytic software	☐ Outdated or lack of appropriate analytic software
☐ Other(specify below) _____	☐ Other(specify below) _____	☐ Other(specify below) _____
Researching for new insights and innovative solutions to health problems	Promoting and contributing expertise to the linkage of data systems that can facilitate high level epidemiologic analysis	Translating analytic findings into information that can be directly useful to program and policy staff, legislators, and other decision makers
☐ Inadequate number of staff(FTEs)	☐ Inadequate number of staff(FTEs)	☐ Inadequate number of staff(FTEs)
☐ Staff with inadequate skills or training	☐ Staff with inadequate skills or training	☐ Staff with inadequate skills or training
☐ Inadequate data resources	☐ Inadequate data resources	☐ Inadequate data resources
☐ Outdated or lack of appropriate analytic software	☐ Outdated or lack of appropriate analytic software	☐ Outdated or lack of appropriate analytic software
☐ Other(specify below) _____	☐ Other(specify below) _____	☐ Other(specify below) _____

6. To what extent do the MCHEs in your local/state health department contribute to decision-making for MCH programs? Consider both the direct participation of the MCHEs and the use of the reports and analyses they produce when answering for each of the following areas.

NEEDS ASSESSMENT	PRIORITY SETTING	PROGRAM PLANNING
☐ Not at all	☐ Not at all	☐ Not at all
☐ Minimally	☐ Minimally	☐ Minimally
☐ Partially	☐ Partially	☐ Partially
☐ Substantially	☐ Substantially	☐ Substantially
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full
PERFORMANCE MEASUREMENT	PROGRAM EVALUATION	POLICY DEVELOPMENT
☐ Not at all	☐ Not at all	☐ Not at all
☐ Minimally	☐ Minimally	☐ Minimally
☐ Partially	☐ Partially	☐ Partially
☐ Substantially	☐ Substantially	☐ Substantially
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full

7. Does one or more of the MCHE staff have unfettered access to the following STATE data sets? (“Unfettered access,” means that the epidemiologist can have immediate access using his/her own computer to either the original data set or an analysis-ready, unaggregated version, along with the coding and variable descriptions necessary to understand the structure and meaning of the data. NOTE: These data are made available from the state, not via a CDC website or NCHS website)

DATA	UNFETTERED ACCESS?	IF YES, ARE DATA AVAILABLE WITHIN 1 CALENDAR YEAR OF DATA COLLECTION?
Birth Certificate Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Death Certificate Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Fetal Death Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Linked birth-infant death data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Medicaid Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Newborn Screening Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Birth Defects Registry Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Family Planning Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Abortion Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Immunization Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
WIC Data (e.g., breastfeeding)	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Hospital Discharge Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
Emergency Department Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
EMS Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
PRAMS (or equivalent)	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
YRBS (or equivalent)	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never
BRFSS Data	☐ Yes ☐ No	☐ Always ☐ Almost Always ☐ Rarely ☐ Never

8. When appropriate, do MCHE staff commonly calculate, carry out, and/or provide:

Population specific rates? (e.g., age-specific, race/ethnicity specific, sex-specific, or region/county/city-specific rates)	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Confidence intervals? (even if not shown in text, tables, or figures)	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Comparison rate, such as the US rate, HP2010 objectives, state-generated objectives?	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Statistical testing for comparisons of means, proportions and/or rates?	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Multivariable analysis? (e.g., stratified analysis and/or regression modeling.)	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never

9. Does your local/state health department have a publically accessible, interactive, on-line query system for vital records and related health data that allows for user-defined queries and may include statistical analyses (e.g., basic test statistics and confidence intervals)?

☐ Yes

☐ No

Website address: _____

10. Within your local/state health department, which of the following best characterizes the current level of collaboration between/among MCHEs in your local/state health department and...

MCH/Title V program staff	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
The Title V Director	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
CSHCN program staff	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
The Title V Director for CSHCN	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
WIC Staff	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Infectious Disease	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Public Health Preparedness	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Injury	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Oral Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Mental Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Substance Abuse	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Chronic Disease	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Environmental Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Occupational Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Birth Defects	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Other: _____	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never

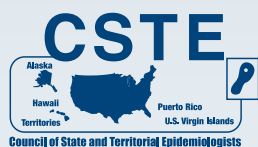
11. Which of the following best characterizes the current level of collaboration between/among MCHEs in your local/state health department and epidemiologists in...

Schools of Public Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Other academic institutions	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Governmental organizations (e.g., CDC, NCBDDD, HRSA, MCHB)	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Non-governmental organizations	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Other: _____	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never

12. During the past 12 months, have MCHEs in your local/state health department conducted or collaborated on MCH-related work in...

Maternal/Infant Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Child Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Adolescent Health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Children/Adolescents with special health care needs	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Women's health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Men's health	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Case Reviews (FIMR, child death review, maternal mortality)	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Social determinants of health, including access to care/health equity	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never
Racial/ethnic disparities	☐ Routinely ☐ Frequently ☐ Infrequently ☐ Rarely ☐ Never

13. Do the MCHEs in your local/state health department generally have ready access (0 to 3 days return, electronic or hard-copy) to current medical, epidemiologic, and public health full-text articles and journals?
- ☐ Full access
 - ☐ Substantial access (e.g., >25 journals, but not full access)
 - ☐ Partial access (e.g., less than 25 journals)
 - ☐ No Access



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