FROM MEASURING TO IMPROVING PUBLIC HEALTH PRACTICE

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ABSTRACT
Efforts to measure public health practice have taken on various forms and focused on different aspects of the system of public health practice over the past century. Before 1990, measurement was primarily based on a series of self-assessment instruments initiated under the auspices of the Committee on Administrative Practice of the American Public Health Association. These instruments emphasized measurement of immediate results of local public health services although they also provided information on local resources and capacity to perform. Following the Institute of Medicine’s report in 1988, efforts began to focus on performance related to public health’s core functions. These more recent assessments suggest that the system of public health practice must be improved to achieve the targets of effectiveness established for the year 2000. Ultimately, a comprehensive national surveillance system for public health practice will need to both measure and examine the relationships among inputs (resources, capacity, etc), core function-related processes, outputs (services) as well as outcomes.

INTRODUCTION
In the nearly ten years since the Institute of Medicine (IOM) reported on the state of public health in the United States, the mission, substance, and core functions of public health have been re-articulated (19); important and achievable national health objectives have been established for the year 2000 (39, 58); exciting opportunities afforded by better integration of our public health and medical care activities have emerged (8); and new approaches for improving results throughout the public health system have gained momentum (9, 21, 22).
Although the sad state of affairs decried in the IOM report has undergone considerable change over the past ten years, it is much less clear whether these changes have led to improvements in public health practice or, more importantly, in the results of public health practice—health outcomes. This chapter describes efforts to measure the extent and effectiveness of public health practice in the United States since 1900, and examines the approaches, findings, and implications of these activities for future efforts toward improving health outcomes through the public health system.

A basic tenet of improving systems is that results reflect the systems that produce them. As is often stated, “Every system is perfectly designed to achieve exactly the results it gets” (9). This simple aphorism unmasks the major challenge confronting efforts to improve the results of public health practice: improving health outcomes calls for improving the system of public health practice itself. But, as some additional improvement wisdom warns, to improve something we must be able to control it; to control it we must be able to understand it; and to understand it we must be able to measure it (18). Public health professionals would be quick to add an even more basic need: Before we measure something, we must be able to define it operationally. Defining, measuring, understanding, and controlling are the essential elements of the improvement agenda for the public health system.

There is ample evidence that the public health community has been wrestling with this agenda for the greater part of this century. Unfortunately, past efforts to measure public health practice lacked an adequate conceptual framework for defining the public health system. As a result, these efforts focused on measuring aspects of the public health system that only indirectly or partially characterized the functions embodied in public health practice. Consequently, opportunities for understanding, controlling, and improving public health practice and health outcomes were limited. Still, these efforts set the stage for developments since the 1988 IOM report and the even greater opportunities that lie ahead.

Eras of public health practice performance measurement can be conveniently separated by the IOM report’s appearance in 1988. Importantly, an examination of measurement issues is part and parcel of an examination of what public health practice is, what it does, and how it does what it does. Over much of this century, the purpose and functions of public health (what it is and what it does) were confused with how it carries out its purpose and functions through the delivery of specific community services. As a result, public health, like many other enterprises, has become known more by its deeds than by whether it is achieving its intent. Likewise, efforts to measure public health practice have been in accord with the prevailing perceptions as to what constituted public health practice at different points in time. In light of these considerations, what
follows examines both the measurement of local public health practice as well as its conceptualization.

EFFORTS TO DESCRIBE WHAT LOCAL PUBLIC HEALTH PRACTICE DOES

Measurement of Local Public Health Services: 1915–1987

Efforts to characterize and measure public health practice in the United States date back more than 80 years. It is tempting to speculate that early efforts were designed primarily to describe and count resources and services rather than to measure performance relative to established standards. This interpretation, however, is not completely accurate.

Much of the early activity focused on local public health practice, although the earliest attempt in 1914 targeted state health departments. At that time Chapin completed a survey of state health agencies for the American Medical Association to describe the services of those agencies and their role in fostering the development of local health departments. Chapin concluded that state public health agencies were “mostly ill-balanced. Much of what is done counts little for health and much is left undone which would save many lives” (57). In response, he formulated relative values for various preventive services and scored the state agencies on each service and in the aggregate. This quantitative approach was later incorporated into local public health practice appraisal initiatives orchestrated by the American Public Health Association (APHA).

In 1921, the First Report of APHA’s Committee on Municipal Health Department Practice (1, 2) called for the collection of information on local public health practice to provide the basis for the development of standards of organization and achievement for local health departments (LHDs) serving the nation’s largest municipalities. The Committee concluded that “few standards are available to the health officers who would pattern their departments after those which predominate in American practice or achieve most satisfactory results” (2). A survey instrument was developed and applied to 83 cities through site visits involving various committee members, including public health giants Winslow (committee chairman), Chapin, and Frost (2).

The Committee soon saw the need to examine local public health practice more broadly and in 1925 was reconstituted as APHA's Committee on Administrative Practice. The new Committee developed the first version of an Appraisal Form (3, 4), which was designed to provide “a reasonably accurate picture of the health services performed in a city” (4) and to focus

... not on money expended or personnel employed, which indicate resources rather than performance. Nor was it to be based on mortality rates, which are affected by so many
racial and industrial factors as to make comparisons between various cities misleading. The idea was rather to measure the immediate results attained—such as statistics properly obtained and analyzed, vaccinations performed, infants in attendance at instructive clinics, physical defects of school children discovered and corrected, tuberculosis cases hospitalized, laboratory tests performed—with the confidence that such immediate results would inevitably lead on to the ultimate end of all public health work, the conservation of human life and efficiency (4).

The Appraisal Form was to be used as a self-appraisal tool by local health officers with a focus on all public health work—"that performed by official agencies . . . and that performed by unofficial agencies as well" (4). Successive iterations appeared throughout the 1920s and 1930s, and were generally well received by LHDs, although there were occasional concerns that quantity was being emphasized over quality (59). Local health officers were able to compare their ratings with other agencies and submit their assessment to the Health Conservation Contest and its successor, the National Honor Roll. The basis for comparison was a numerical rating score based on aggregated points awarded across key administrative and service areas. Comparative ratings were to be used to improve health programs, advocate for resources, summarize health agency activities in annual reports, and engage other health interests in the community (4). Agency ratings often attracted considerable media interest, resulting in both good and bad publicity for local agencies as "newspapers devoured the results. National magazines interested in the public health field commented extensively on it. More important still, the cities concerned took steps to make the improvements needed" (43). Despite the initial intent to emphasize "immediate results," the major focus of the ratings remained on measuring some of the more concrete aspects of public health practice such as staff, financial resources, and clinic sites (6, 15).

In 1943, the Appraisal Form was replaced by a new, and still voluntary, instrument, the Evaluation Schedule, which was scored centrally by the APHA Committee on Administrative Practice. The Evaluation Schedule attempted to measure "first, problems or needs; second, available resources; and third, as objectively as possible, the degree of success in applying appropriate resources to those various needs" (6). The National Honor Roll was discontinued in 1943 and succeeded by the National Reporting Area for Health Practices and "Health Practice Indices" (6, 14). No longer was the focus on good or bad scores; the indices presented scores for health agencies of varying size and type so that individual LHDs could directly compare their performance in meeting community needs with that of their peers (5). These new initiatives placed even greater emphasis on measuring results rather than resources and activities while broadening the unit of analysis from the health department to the community as a whole (15).
In order to develop a blueprint for a national network of local public health departments that would provide every American with coverage by a local health department, the Committee on Administrative Practice established a Subcommittee on Local Health Units chaired by Emerson. The Emerson Report (14) of 1945 served as a landmark for recommendations regarding local public health practice and virtually became the post war plan for public health in the United States. The report gave increased prominence to six basic services believed to represent local government’s public health responsibilities to its citizens. These “basic six” services were: vital statistics, communicable disease control, environmental sanitation, public health laboratory services, maternal and child health services, and public health education (14). This was essentially the same package of services that had been considered the standard of practice among LHDs for several decades and which had been assessed since the early years of the Appraisal Form. Over time, these services have been widely known as the basic six “functions” of LHDs. Because of the Emerson Report, however, they became the cornerstone for restructuring local public health agencies. Although the report’s extensive recommendations never became national public policy, they stimulated change in many states (48).

During the height of its efforts the APHA Committee on Administrative Practice stimulated considerable interest in local public health practice; this interest persisted until several years after the Committee’s demise in 1956, when its functions were split among several association committees. A series of APHA policy statements from 1950–1970 illuminate “the search for mission redefinition” (48) for local public health practice. In a 1950 APHA statement on local health department services and responsibilities, the basic six were presented as desirable minimal services while a new list of “optimal” responsibilities was unveiled: recording and analysis of health data, health education and information, supervision and regulation, provision of direct environmental health services, administration of personal health services, and coordination of activities and services within the community (7). An APHA policy statement in 1963 added seventh and eighth services to the basic six: operation of health facilities and area-wide planning and coordination (48). A 1970 APHA policy expanded these concepts to call for increased involvement of state and local health departments in coordinating, monitoring, and assessing the adequacy of health services in their jurisdictions (48). Nonetheless, beginning in the 1950s, APHA’s intensive interest in local public health practice and its measurement diminished as the association took on national health policy concerns, especially gaps in the medical care system.

The changing expectations for local public health practice after World War II emerged as a major issue for LHDs (32). Lack of medical care was identified as an significant impediment to promoting and improving community health,
and LHDs became increasingly called upon to fill a safety net function. A 1947 study by Terris & Kramer (51) concluded that health departments had advanced beyond the traditional basic six model and were increasingly involved in administering general medical services. Myers and colleagues, in concert with PHS and the Association of State and Territorial Health Officials (ASTHO), completed a similar examination in 1966; however, they concluded that LHDs were not emerging as leaders within their communities in integrating medical and community health services (34). The movement into medical care appears to have been controversial from its inception.

Hanlon in examining the future of LHDs in 1973 called for official public health agencies to withdraw from the business of providing personal health services (whether preventive or therapeutic) and instead “concentrate upon its important and unique potential as community health conscience and leader” in promoting the establishment of sound social policy (17). A series of studies by Miller and colleagues during the 1970s and 1980s (10, 13, 24–26) provided new insights into the public health infrastructure and the effect of various forces on LHDs. Despite Hanlon’s call, these studies largely supported the need for LHDs to provide personal health care services within their communities.

**Measurement of Core Public Health Functions: 1988–2000**

The picture of the state of the public health system painted in the IOM report was more dismal than many had expected. After all, the infrastructure of the national public health system had grown substantially throughout the century, especially in terms of LHD coverage of the population. There was widespread acceptance of an expanded package of community services that added chronic disease prevention and medical care to the “basic six.” And, more importantly, health status had never been better. Yet, the tragic face of the AIDS epidemic had appeared, and there was no shortage of intractable health and social issues now being placed on the public health agenda. Resources to meet these challenges were greatly limited due in part to the insatiable appetite of the medical care delivery system for every available health dollar. Somehow these forces had acted together to dissipate public appreciation and support for public health, and the IOM feared that public health would not be able to meet these challenges without a new vision that would engender the support of the public, policy makers, the media, the medical establishment, and other key stakeholders.

The vision articulated in the IOM report was founded in a broader view of public health functions than had existed in the past. In part, the IOM built upon the concept of a governmental presence at the local level that emerged in the planning of the initial model standards process (40). Throughout earlier decades, the services provided by public health agencies had come to be
viewed as public health’s “functions.” In characterizing three core functions (assessment, policy development, and assurance), the IOM report suggested that the function “to serve”—whether termed services, assurance, or something else—is an inadequate characterization of the unique role of public health in our society. Why should the “functions” of public health change whenever the system responds to changing conditions with a new set of services? Services should be viewed as the output of carrying out public health’s core functions rather than as the “functions” themselves. When the focus shifts from services to functions, greater attention can be directed to the operational aspects of those functions in ways that allow for their performance to be improved. As a result, it becomes possible to measure inputs (e.g. budgets, staff), operational aspects of the core functions themselves (practices or processes), and to relate these to the outputs (e.g. services) provided, and ultimately to health status in the community (Figure 1).

The IOM report was soon followed by a series of initiatives to facilitate operationalization by LHDs of the core function framework, especially its assessment and policy development components. New national health objectives were established for the year 2000 based on a decade’s experience with the year 1990 national health objectives (58). Broader participation in their design and better tools for their implementation in community settings distinguished the year 2000 objectives from the earlier effort. An updated version of the Model Standards document was created with the specific aim of linking it with the year 2000 health objectives (39). Several community needs assessment instruments—all
using the same basic steps and fostering community participation—were promoted by various health organizations. The national public health organizations developed understandable guidance to facilitate the use of these tools as a means of operationalizing public health’s core functions within the community (39).

In addition, for the first time ever, a national health objective for coverage of the population by an effective local public health presence was developed. By the year 2000, Objective 8.14 called for 90% of the population to be served by a LHD that was effectively carrying out public health’s core functions in that community (58). Despite little consensus as to what was meant by “effectively” addressing the core functions of public health, the implication was clear that counting the number of LHDs or even “immediate” results would no longer be sufficient.

One of the most important of these new initiatives was the development of the Assessment Protocol for Excellence in Public Health (APEXPH) by the National Association of County and City Health Officials (NACCHO) in collaboration with other national public health organizations (38). APEXPH provided a tool for organizational self-assessment and improvement for LHDs as well as a simple and effective community needs assessment process. Since its appearance in 1990, APEXPH has been well accepted among LHDs; nearly one half of all LHDs had utilized it as of mid-1996. Use of the APEXPH framework has been credited with significant change in LHD practice patterns in Illinois, Washington State, and elsewhere (41, 55).

The Center for Disease Control (CDC)’s Public Health Practice Program Office stimulated several research activities related to the new Objective 8.14. These projects sought to design and test public health practice measures related to the core functions of public health both for the purpose of measuring progress toward Objective 8.14 and for assessing the operational aspects of the core functions (practices). A framework using ten organizational practices as operational definitions for the three core functions was used to evaluate local public health performance (16, 27–31, 55, 56); this was initially used to assess LHD practice performance patterns in six states (12, 44, 45) as well as in a national sample of LHDs in an effort to benchmark progress toward Objective 8.14 (56), and to relate LHD personnel expenditures to core functions (49).

The findings from these various studies provided little comfort to the public health community as to the adequacy of the public health system in addressing its core functions. One recent study (49) found that 89% of the manpower hours of one large LHD were expended in carrying out practices related to the assurance function. Nine percent of the total manpower hours were devoted to the assessment function while only two percent were devoted to policy development. When the various practices and functions were related to specific
programs and services, primary care and communicable disease programs cons-
sumed three fourths of the LHD’s resources (49).

Several studies used similar measures of core function–related practice per-
formance to examine mean LHD performance scores (the percent of practice performance measures fulfilled). In one study of a national sample of 208 LHDs in 1993, the mean performance score on a panel of ten measures was 50% (56). In another 1993 study of 370 LHDs in six states, the mean performance score was 56% based on a panel of 26 items (44). The use of this same 26-item panel with a group of 14 LHDs that have been longitudinally followed since the 1970s produced similar performance patterns (30). These findings are consistent with results from NACCHO’s 1992/93 profile of LHDs (37), which found similar levels of performance using questions that were comparable to many of those used in these various studies.

During the formulation of the Clinton Health Security Act proposal in 1994, federal officials sought to integrate public health practice into the health re-
form proposal. A set of core public health functions was identified and received widespread attention despite creating some confusion with the IOM report core functions. PHS established a national working group to develop a single characterization of public health practice in view of confusion surrounding the IOM core functions, health reform’s core functions, CDC’s ten public health practices, and NACCHO’s blueprint for healthy communities (36). The result was a single statement that characterized what public health does for exter-
nal constituencies and how it does those things for more internal constituencies. The list of ten has become known as the ten essential services of public health (8), although it is comprised of inputs, processes, and outputs (services) (52).

EFFORTS TO MEASURE PUBLIC HEALTH STRUCTURE

Both before and after the IOM report, efforts were made to assess the overall national public health system. These efforts have focused primarily on structural aspects of the system (such as the presence or absence of a LHD in a jurisdiction and the full or part-time availability of health officers), but have not necessarily related these inputs to public health’s functions. During the period 1914–1988, several examinations described below tracked increases in the number of LHDs, the number of full-time LHDs, and the population served by those categories of LHDs.

After 1915, the growth in the number of LHDs occurred primarily among county-based agencies. The number of counties with full-time public health services increased from 14 in 1915 to 762 in 1935 to 2088 in 1950 (23, 46). Since some of these agencies served more than one county, and because some were
organized at the municipal, district, or other level, the number of LHD units actually grew from 886 in 1935 to 1348 in 1950 (46). The proportion of the population served by full-time LHDs increased from 56% in 1935 to 89% by 1957 (46).

The Emerson Report had advanced several targets for the national public health system including one calling for complete coverage of the population by full-time LHDs (meaning those with full-time health officers) (14). However, other targets established in the Emerson Report also allow for some interesting insights into the capacity of the national public health system at this time. For example, the committee found that the nation had 64% of the public health personnel and 63% of financial resources needed to assure full coverage of the population (14).

Outside of these APHA-generated efforts, there were only scattered efforts to capture information on public health practice in a composite fashion. These include a follow-up to Chapin’s 1914 examination of state health departments performed by Ferrell in 1929 (48) and Mountin’s authoritative report (33) on federal, state, and local public health activities in 1950. More extensive information on state health agencies became available later through the establishment by ASTHO of a national Public Health Reporting System in 1970 through the Public Health Foundation (PHF). Although useful in terms of expenditures and programs for the official state health agencies, until the 1990s these reports had very little information on the public health activities of LHDs. Information on state-level environmental protection, substance abuse, and mental health services was also incomplete if these services were the responsibility of agencies other than the official state health agency. An effort to capture all core function–related expenditures of states through these various state agencies was piloted in 1996 after an earlier effort to identify core function–related expenditures of official state health agencies was completed in 1994 (42).

Information on local public health activities became increasingly available after 1987 through the efforts of PHF, CDC, and NACCHO. PHF has attempted to enhance information reported by state health agencies about local public health activities in its reporting system and also in its 1994 study of core function–related expenditures in six states (42). However, the most extensive information on local public health activities has been provided by recent profiles of LHDs by NACCHO (35, 37), and of state-local systems by CDC (11).

LESSONS FROM 80 YEARS OF MEASUREMENT

During the 60-year period from 1925–1985, an increasing body of information was being assembled on the structure of public health practice (LHDs, expenditures, health officers, boards of health, state-local relationship, size and type of jurisdiction, agency staff, professional disciplines of staff, organizational
structure, etc). At the same time, information on services provided to the community was increasingly available for the basic six, as well as chronic disease prevention, medical care services, and a variety of optional and optimal services. Even with such information on the inputs and outputs of public health practice, the links between inputs and outputs were not clear, and their relationship to an effective governmental presence were even less so. Further, this information base was largely generated and used within the governmental public health sector at the state and local level, with little impact on national policy or on nongovernmental stakeholders in the health system.

Efforts during the post-IOM report period have also failed to be comprehensive; as a result, we have neither a clear nor a complete picture of the status of public health practice at the end of the twentieth century. The NACCHO profiles provide considerable information on LHD characteristics, especially with respect to structure and services (inputs and outputs), and allow for a current estimate of full-time coverage. While there is no nationally agreed upon tool or instrument to assess whether LHDs are effectively carrying out the core functions (processes/practices), inferences from the NACCHO profiles, together with the practice performance studies stimulated by CDC, suggest that the current level of public health practice performance is 50–70% of what would be considered “fully” effective, and that fewer than 40% of the population in the United States is served by a LHD effectively addressing public health’s core functions within its jurisdiction (56).

The various evaluations performed in the two eras described here are not readily comparable, and the standard of practice has no doubt changed over the past 75 years. Meaningful comparisons between the findings of the Committee on Administrative Practice’s evaluation in the mid-1940s and those from the early 1990s are not possible because of differences in the methods and measures. The earlier studies largely examined inputs and outputs (services) whereas later efforts emphasized processes/practices (functions). These different approaches are illustrated in Table 1, which compares key measures from the Evaluation Schedule with 20 core function–related measures used in several studies completed in the 1990s.

These tracings are far from complete, but several common themes emerge. The first is that measurement for the sake of measurement has never been the purpose of these activities; the intent has consistently been to gather information that would be useful for improvement of local public health practice. The earliest available instruments, including the Appraisal Form and Evaluation Schedule, placed considerable emphasis on results, although generally the results of specific services rather than broader functions. In this light, they examined whether things were being done right rather than measuring whether the right things were being done.
Table 1  Comparison of public health practice performance measures used in 1947 and 1995

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<tr>
<td>Hospital beds: percentage in approved hospitals</td>
<td>Assessment For the jurisdiction served by your local</td>
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<tr>
<td>Practicing physicians: population per physician</td>
<td>health department, is there a community needs assessment process that</td>
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<tr>
<td>Practicing dentists: population per dentist</td>
<td>systematically describes the prevailing health status in the community?</td>
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<tr>
<td>Water: percentage of population in communities over 2500 served with approved water</td>
<td>In the past three years in your jurisdiction, has the local public health agency surveyed the population for behavioral risk factors?</td>
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<td>Sewerage: percentage of population in communities over 2500 served with approved sewerage systems</td>
<td>For the jurisdiction served by your local health agency, are timely investigations of adverse health events, including communicable disease outbreaks and environmental health hazards, conducted on an ongoing basis?</td>
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<tr>
<td>Water: percentage of rural school children served with approved water supplies</td>
<td>Are the necessary laboratory services available to the local public health agency to support investigations of adverse health events and meet routine diagnostic and surveillance needs?</td>
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<tr>
<td>Excreta disposal: percentage of rural school children served with approved means of excreta disposal</td>
<td>For the jurisdiction served by your local public health agency, has an analysis been completed of the determinants and contributing factors of priority health needs, adequacy of existing health resources, and the population groups most impacted?</td>
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<td>Food: percentage of food-handlers reached by group instruction program</td>
<td>In the past three years in your jurisdiction, has the local public health agency conducted an analysis of age-specific participation in preventive and screening services?</td>
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<td>Food: percentage of restaurants and lunch counters with satisfactory facilities</td>
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<td>Milk: percentage of bottled milk pasteurized</td>
<td>Policy Development For the jurisdiction served by your local</td>
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<tr>
<td>Diphtheria: percentage of children under 2 years given immunizing agent</td>
<td>public health agency, is there a network of support and communication relationships which includes health-related organizations, the media, and the general public?</td>
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<td>Smallpox: percentage of children under 2 years given immunizing agent</td>
<td>In the past year in your jurisdiction, has there been a formal attempt by the local public</td>
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Table 1  (Continued)

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<tr>
<th>Examples of performance measures from Evaluation Schedule(^a) (1947)</th>
<th>Consolidated panel of core-function related performance measures(^b) (1995)</th>
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<tr>
<td>Whooping cough: percentage of children under 2 years given immunizing agent</td>
<td>health agency at informing elected officials about the potential public health impact of decisions under their consideration?</td>
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<tr>
<td>Tuberculosis: newly reported cases per death, 5-year period</td>
<td>For the jurisdiction served by your local public health agency, has there been a prioritization of the community health needs which have been identified from a community needs assessment?</td>
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<td>Tuberculosis: deaths per 100,000 population, 5-year period</td>
<td>In the past three years in your jurisdiction, has the local public health agency implemented community health initiatives consistent with established priorities?</td>
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<td>Tuberculosis: percentage of cases reported by death certificate</td>
<td>For the jurisdiction served by your local public health agency, has a community health action plan been developed with community participation to address priority community health needs?</td>
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<td>Syphilis: percentage of cases reported in primary, secondary, and early latent stage</td>
<td>During the past three years in your jurisdiction, has the local public health agency developed plans to allocate resources in a manner consistent with the community health action plan?</td>
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<td>Syphilis: percentage of reported contacts examined</td>
<td>For the jurisdiction served by your local public health agency, are age-specific priority health needs effectively addressed through the provision of or linkage to appropriate services?</td>
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<tr>
<td>Maternal: puerperal deaths per 1000 total births, 5-year rate</td>
<td>Assurance</td>
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<tr>
<td>Maternal: percentage of antepartum cases under medical supervision seen before sixth month</td>
<td>For the jurisdiction served by your local public health agency, have resources been deployed as necessary to address the priority health needs identified in the community health needs assessment?</td>
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<tr>
<td>Maternal: percentage of women delivered at home under postpartum nursing supervision</td>
<td>In the past three years in your jurisdiction, has the local public health agency conducted an organizational self-assessment?</td>
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<tr>
<td>Maternal: percentage of births in hospital</td>
<td>For the jurisdiction served by your local public health agency, are age-specific priority health needs effectively addressed through the provision of or linkage to appropriate services?</td>
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<tr>
<td>Infant: deaths under 1 year of age per 1000 live births, 5-year rate</td>
<td>In the past three years in your jurisdiction, has there been an instance in which the local public health agency has failed to implement a mandated program or service?</td>
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(Continued)
In both periods, it has been easier to measure aspects of the public health system than to develop consensus as to what these measurements tell us about the effectiveness of public health practice.

It was Chapin’s epoch-making study of state health departments in 1914 that was mainly instrumental in directing attention to the practical advantages of expressing the extensive details of health surveys in terms of simplified numerical scores or grades; which would be combined into a single total score. This proposal of expressing public health activity and achievements in terms of numerical scores precipitated heated debate in the early meetings of the Committee on Administrative Practice ... On the one side was the fear of scientific unsoundness in attempting to place weighted values on the separate measures and practices followed in a public health program. Opposed to this was the feeling that the promotion of public health require some means of ready visualization of degrees of achievement in order to create understanding and interest on the part of both the public and professional groups (6).

Where the Appraisal Form of the 1920s and 1930s placed emphasis on health department effort such as “number of visits” and “number of inspections,” the Evaluation Schedule of the 1940s and 1950s focused on the resulting health protection of the community as a whole, recognizing contributions in effort.
from all sources—private practitioners, voluntary agencies, and others—as well as from the health department. This information was quite useful for the local jurisdictions that voluntarily participated in these assessments. Participation was far from universal, however, so that the aggregated information could not adequately characterize the national effort. When efforts were undertaken to assess the national public health system, it was simpler to measure basic structural aspects such as number of LHDs and full-time coverage than either services or functions that were not well-defined.

In the current period, the preference for counting inputs and outputs (services) has inhibited efforts to gain national consensus on surveillance strategies and methods to assess progress toward Objective 8.14, which focuses on core function–related performance. Seven years after this important national health objective was unveiled, there are still no nationally agreed upon methods and tools for its measurement. Therefore, only limited information is available as to how close the nation is to its achievement.

As would be expected, standards, when used before 1990, primarily related to inputs and outputs rather than to the processes necessary to carry out the public health core functions characterized in the IOM report. Standards, or performance expectations, for public health core functions developed after 1990 have proven to be useful for a variety of applications, including some efforts at practice surveillance vis-à-vis Objective 8.14 (56), agency self-assessment for capacity building (29–31), and the development of performance standards in state-local public health systems (54). Still, these standards appear to be in an early stage of development. Performance standards for other health organizations have become commonplace in recent decades (21), often involving the Joint Commission on the Accreditation of Health Care Organizations (JCAHO). The establishment of a national accreditation or certification initiative for LHDs through either the national public health organizations or JCAHO has not been given serious consideration. Absent a federal initiative to support and fund core function activities of LHDs through block grants to states, a voluntary national accreditation program for LHDs may be the most realistic approach to promoting widespread adoption of practice standards related to the core functions (53).

The somewhat interchangeable use of the terms functions and services, particularly in the earlier period, is revealing in that it suggests that, at least as perceived initially, the prime function of local public health was to serve. The “basic six” were essentially six services, five clearly so (communicable disease, environmental sanitation, public health lab services, maternal and child health, health education), whereas the sixth (vital statistics) reflected primarily the service elements of registering vital events. This confusion of services with functions is of more than passing interest in that measuring the performance of public health functions is essential to improve performance. If services are
considered synonymous with functions, and services are measured, then the
best that can be expected is that the performance of those services may be im-
proved. Yet these may or may not be the right services in terms of community
need and expectations. Operational definitions for the core functions (such
as practice performance standards), to be measured along with inputs, outputs
(including services), and outcomes, provide a more comprehensive framework
for performance monitoring of the public health system (Table 2). This type of
comprehensive performance monitoring activity requires a performance data
base similar to the one proposed by Studnicki (50).

Revised LHD certification requirements in Illinois illustrate these issues.
As part of an extensive re-examination and re-structuring of state-local public
health activities, the framework for rules governing state certification of LHDs
in Illinois was changed from one based on services provided to one based on
carrying out public health’s core functions within the community (54). Be-
fore 1993, to be certified by the state health department, Illinois LHDs had
to meet program requirements for ten specific programs. After 1993, LHDs
were required to meet performance expectations related to public health core
functions. This requirement virtually changed the definition of a LHD from one
based on its outputs to one based on its performance relative to its core functions
(Table 3). Services that would result from each LHD’s carrying out of its core
functions would include three categories: those required by state public health
laws (communicable disease control, food sanitation, sewage, water); those re-
quired by local laws or ordinances (variable from jurisdiction to jurisdiction);
and those addressing priority community health needs established through a
community needs assessment and planning process. Assessing programs and
services alone, without examining performance of the processes that generate
such services, leaves gaps in our understanding of LHD effectiveness vis-à-vis

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**Table 2** Types of measures used in activities designed to measure public health practice

<table>
<thead>
<tr>
<th>Activity</th>
<th>Functions/ processes</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisal Forms (1920s and 1930s)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Evaluation Schedule (1940s)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Public Health Reporting System (1970s thru 1990s)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>NACCHO Profiles (1990s)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Practice Performance Measures (1990s)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Comprehensive Performance Monitoring System for Public Health Practice</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Source: Authors.
its core functions. Measuring inputs and outputs (i.e. services), without the core function–related processes, is similarly inadequate.

The preceding examination raises the interesting question as to whether the functions of public health have changed over this century. One possibility or suggestion is that it is not the functions that have changed but our ability to measure their performance; we now have a conceptual framework that allows for services to be distinguished from practices and new tools developed subsequent to the IOM report that can be used to measure different aspects of this framework.

An alternative or even additional explanation is that an understanding of the functions of public health has matured over time. The development and expansion of the public health infrastructure in the United States advanced at a rapid pace between 1900 and 1950. It is conceivable that maturation of the functions of local public health was not possible until that infrastructure had been put into place. While the IOM core functions are often conceptualized as a linear process (assessment → policy development → assurance), it appears that the assurance function, at least in terms of emphasis, developed without commensurate maturation of the other core functions. The limited studies to date consistently identify higher performance on assurance-related practices rather than those related to either assessment or policy development (37, 44, 45, 55, 56). However, improved local public health performance through

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**Table 3** Requirements for certification of local health departments in Illinois before and after July 1993

<table>
<thead>
<tr>
<th>Before July 1993, to be certified as a local health department in Illinois, a local health agency must carry out the following programs:</th>
<th>After July 1993, to be certified as a local health department in Illinois, a local health agency must:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food sanitation</td>
<td>Assess health needs of the community</td>
</tr>
<tr>
<td>Potable water</td>
<td>Investigate health effects and hazards</td>
</tr>
<tr>
<td>Maternal health/family planning</td>
<td>Advocate and build community support</td>
</tr>
<tr>
<td>Child health</td>
<td>Develop policies and plans to address needs</td>
</tr>
<tr>
<td>Communicable disease control</td>
<td>Manage resources</td>
</tr>
<tr>
<td>Private sewage</td>
<td>Implement programs</td>
</tr>
<tr>
<td>Solid waste</td>
<td>Evaluate and provide quality assurance</td>
</tr>
<tr>
<td>Nuisance control</td>
<td>Inform and educate the public</td>
</tr>
<tr>
<td>Chronic disease</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors.
implementation of APEXPH and its derivatives has been demonstrated (55). Greater promotion of these approaches will require new federal incentives to states and localities and greater commitment of the LHD community to performance improvement.

The lack of direct federal public health leadership throughout both periods, but most clearly before 1988, is also of interest. PHS involvement in public health practice measurement efforts can be traced back to the early days of the Committee on Municipal Health Department Practice, despite the lack of an effective public health presence in the federal government. Before the mid-1930s the Public Health Service was a unit of the US Treasury Department. After its placement in the Federal Security Agency and the succession of federal health agencies, there was some improvement. The PHS agency most closely identified with public health practice, CDC, was not created until 1946. Most of CDC’s early emphasis was on categorical programs, although in the late 1980s its Public Health Practice Program Office catalyzed several national capacity-building initiatives. Notably missing even from the 1990 National Health Objectives (established in the early 1980s) was any allusion to local public health functions or to the extent of their availability across the United States. Although this omission was corrected with the year 2000 national health objectives, the lack of national policy and operational plans to measure and achieve that objective suggests a continuing lack of federal leadership. While PHS led the effort to develop a consensus vision for public health in the United States including a formulation of ten essential public health services, there has been little success in reaching consensus on a national practice surveillance system. In addition, the switch to the essential public health services framework from the public health practices may have slowed efforts to measure public health practice effectiveness (52). In an era of increasing political pressure against vast federal bureaucracies and in favor of returning decision-making to state and local governments, another federal government-inspired surveillance system faces formidable obstacles. Without strong federal leadership, the task might only be accomplished if the national practice organizations (especially ASTHO, NACCHO, and APHA) were to make it their priority. Amid other challenges to the public health system in the late 1990s, this is unlikely. APHA’s leadership role from 1920 through the 1970s is noteworthy, although it appears to have diminished considerably since the days of Winslow and Emerson.

Efforts from both eras fail to link public health practice to health outcomes in the community. Before 1990, there was no real effort to do so. After 1990, only one study has attempted to relate LHD practice performance levels to some general community health status indicators (47). No clear links were found, but the study did not focus on health outcomes targeted by community needs assessments. It is now possible to perform such an examination where practice
performance has been tracked over time, and where community needs assessments have led to interventions for high priority community health problems. Various levels of practice performance can now be related to changes in key outcome measures to identify the effectiveness of the various practices.

The increased interest in the broader aspects of public health performance monitoring is apparent in several initiatives developed since 1995. Many of these were stimulated by a 1994 CDC-sponsored Symposium on Measuring Public Health Practice, which examined the state of the art and spawned several important additional initiatives. In 1995, an IOM Committee on Using Performance Monitoring to Improve Community Health was established to broadly examine data needs for monitoring the performance of health services in relation to community health (20). In the same year, PHS funded a project to define information needs for a national public health infrastructure surveillance system that would collect information on inputs, processes, services, and outcomes of public health activities at all three governmental levels. Also in 1995, HRSA funded an evaluation of the training and education needs of the public health workforce to determine the size and composition of the professional public health workforce as well as its qualifications, staffing patterns, and distribution by public health core function. The longitudinal study funded by the Robert Wood Johnson Foundation tracking changes within the health systems of 12 metropolitan areas has added a component to specifically monitor changes in the public health activities within those sites. The findings and recommendations of these panels and studies will help define the public health system information needs for the next decade and beyond, as well as facilitate the use of information for community health improvement initiatives.

CONCLUSIONS

The history of measuring public health practice before the IOM report lacked a conceptual framework that viewed services as an output of the public health system’s functions. As needs and conditions changed, appropriate public health responses in the form of services changed. An initial set of six basic services may have represented an appropriate product of a functioning public health system in the 1920s, at least for LHDs serving large urban populations. But to measure various aspects of those services as a means of assessing performance of the underlying functions is incomplete at best. Performance measurement in the public health system must be able to measure inputs, processes, outputs, and outcomes in ways that allow for changes in one to be linked one with another. Without such a comprehensive public health practice performance monitoring system, we will not be able to make the changes necessary to improve the results we seek. After 80 years of trial and error, the essential ingredients are in
place. A conceptual framework, useful instruments, a national objective for the public health system, and the means of tracking progress over time are all in place. However, the commitment from the public health practice community and the national leadership to get the job done remains elusive. Although it may have taken 75 years to put the pieces in place, any further delay in establishing a comprehensive national system for public health practice will be costly. Ironically, it will now be much easier to measure that price in terms of the unrealized gains in health status that can be achieved through improved public health practice.

Literature Cited


