PERFORMANCE MEASURES FOR ENVIRONMENTAL HEALTH IN NORTH CAROLINA:
BUILDING ON THE NORTH CAROLINA LOCAL HEALTH DEPARTMENT ACCREDITATION PROGRAM

by

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ABSTRACT

The formal practice of Environmental Health in North Carolina has been in existence since at least 1877 when the General Assembly formed a State Board of Health. The responsibilities of the board were to investigate the sanitary and environmental conditions related to the causes of and prevention of disease. Environmental health has been practiced in North Carolina in some form since that time, but today challenges face practitioners of environmental health that threaten to undermine the protections that have been provided for over 130 years.

The North Carolina Local Health Department Accreditation Program (NCLHDAP) provides performance standards for local health agencies that include environmental health programs. These standards are general, requiring specific programs and services, but including few metrics that define and govern performance within the activities.

Performance measures, including and building upon the Food and Drug Administration's (FDA) Voluntary National Retail Food Regulatory Standards, and the Centers for Disease Control's (CDC) National Environmental Public Health Performance Standards, would be beneficial and improve the state and consistency of practice among county environmental health departments in North Carolina.

A set of performance measures are proposed that consider the program activities conducted in North Carolina, identify and acknowledge shortcomings and disparities of practice, and take into account the political climate that has recently promoted privatization of some environmental health services in the state.
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List of Acronyms

CDC Centers for Disease Control
EHS Environmental Health Specialist
EHSS Environmental Health Services Section
FDA Food and Drug Administration
LHD Local Health Department
NC DENR North Carolina Department of Environment and Natural Resources
NCLHDAP North Carolina Local Health Department Accreditation Program
NEnvPHPS National Environmental Public Health Performance Standards
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<td>National Public Health Performance Standards</td>
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Chapter I

Introduction

This paper proposes a set of performance measures to be used by local environmental health departments in North Carolina to foster consistency and eliminate disparity in services provided. The NCLHDAP provides benchmarks for environmental health programs, but contains no programmatic measures which could be used to ensure consistency of practice among local departments.

Environmental Health in North Carolina has been practiced since the late 1800s. Currently, each county is responsible for maintaining an environmental health department, staffed by employees in the employ of the county, and authorized by the state to enforce rules promulgated by the state to regulate foodservice establishments, institutions, lodging places, child day care centers, residential care facilities, swimming pools, tattoos, septic systems, wells, and other environmental matters.

Local environmental health departments are often understaffed, and recruitment and retention of environmental health specialists poses a problem for small and less affluent counties. In many cases, services go unprovided, or long wait times pose problems for customers.

The North Carolina Local Health Department Accreditation program (NCLHDAP) provides some standards for the operation of a local environmental health department, but issues of timeliness, quality, productivity, and performance are unaddressed in the NCLHDAP benchmarks.

In order to assure that the protections and services of environmental health departments across the state are uniform, performance measures should be developed that address the requirements for conducting the activities of an environmental health department. These
measures should assure that the protections for the public health required in the law and rules regarding environmental health are provided for all citizens of the state, regardless of their county of residence.
Chapter II

The History of Environmental Health in North Carolina

In its beginnings, public health was environmental health. The early practice of public health was to ensure basic sanitation to prevent disease from environmental conditions and preserve the safety of food and water (ASTHO, 2005). North Carolina first established a board of health in 1877 when the General Assembly constituted the 150 members of the Medical Society of North Carolina as the State Board of Health (Public Health Statistics Branch, 1977; Southern, 2004). The responsibility of the board was to investigate the sanitary and environmental conditions related to the causes of and prevention of disease, especially epidemics, and with disseminating information on health matters to the public (Southern, 2004). Thus the practice of environmental health has been a facet of public health since its inception in North Carolina. In 1879 such a large board having performed in an inefficient manner, “An Act Supplemental to an Act Creating the State Board of Health” reconstituted the board with a membership of nine, said members being appointed jointly by the State Medical Society and the governor (Public Health Statistics Branch, 1977).

In 1893 the public health law passed by the General Assembly expanded the duties of the state board to include advising institutions, towns, and corporations regarding the sanitary treatments of water supplies and sewage. Local officials were required to submit plans to the state board for sewage treatment systems (Southern, 2004). 1

1 A report from an inspection at the University of North Carolina the same year provides some illumination on the methods of the day: “There were no sanitary conveniences at the University until last year when the basement of the library building (Smith Hall) was fitted up with a fair number of water closets, urinals, bathtubs and showerbaths. The sewage is discharged into a small branch about one thousand feet from the buildings, and no fear of trouble arising from this method of control is apprehended”. These “conveniences” were somewhat less useful than today’s as by 1895 reports noted that there was insufficient water supply to utilize them. As late as 1906, students routinely used the wooded area south of Gerrard Hall and South Building for sanitary purposes (Public Health Statistics Branch, 1977). Students strolling through Polk Place today might conclude that many advances in sanitation have been achieved through continuing environmental health efforts.
In 1899 public water supply protection was added as a responsibility of the State Board of Health and it was required to instruct local boards of health regarding water sampling and inspection (Southern, 2004).²

In 1919, regulation of the construction and maintenance of privies by the state board of health was authorized by the General Assembly. This was the beginning of the environmental health program that is today the Onsite Water Protection Section. The Bureau of Sanitary Engineering and Inspection oversaw the regulation. Regulation encompassed recommendation of types of privies suitable to soil conditions and watershed protection, and inspection, licensing and closure of operating privies (Southern, 2004).

In the 1930s and 1940s, acting on advice by the Brookings Institution, the General Assembly established changes in the State Board of Health. The Division of Sanitary Engineering was granted new authority to establish rules for fresh meat markets. Local inspectors filed reports with the local health officer or state health officer. This was the beginning of the current Environmental Health Services Section. During World War II, the Division of Sanitary Engineering’s responsibilities were expanded to include milk, shellfish and restaurant sanitation (Southern, 2004).

By early 1970, there were over 300 state agencies or departments, and a plan was developed by the legislative Governor’s Commission of State Government Reorganization to group “like” agencies to reduce administrative overhead (Odom, 2007). The Executive Organization Act of 1971 moved the State Board of Health into a cabinet-level umbrella agency the Department of Human Resources (DHR). It retained its statutory powers and duties, but the

² The Old Well at UNC was an aesthetic victim of this regulatory authority. A 1902 inspection report states that the substitution of a pump for the accustomed bucket and chain “does violence to the sentiment which has clung to the well for a century”, but nonetheless opines that the interests of public health had been served (Public Health Statistics Branch, 1977).
The subsequent Executive Organization Act of 1973 transferred all powers of the state in relation to public health to the Division of Health Services (DHS) of DHR. The State Board of Health thus ceased to exist (Southern, 2004).

The decade of the 80s saw many changes and developments in the field of environmental health. Activists, scholars, and public policymakers argue that the term “environmental justice” was brought to the national forefront by events in Warren County, North Carolina when the state proposed to place a hazardous waste landfill in the predominately poor, black community (Lowery, 2002; McGurty, 2007). Regulations were adopted and expanded to cover threats to health and safety such as public swimming pools and lead poisoning hazards (“Lead poisoning in children”, 1989, "Public swimming pools”, 1990). An act requiring environmental health practitioners to be registered created the Board of Sanitarian Examiners.

In 1997, all individual health services were placed under the Department of Human Resources, which was renamed the Department of Health and Human Services (DHHS). The current Department of Environment and Natural Resources (NC DENR) was reorganized to oversee the remaining programs, with sections including Environmental Health Services, On-Site Water Protection, Children’s Environmental Health, and the Office of Education and Training, Public Health Pest Management, Shellfish and Recreational Water Quality, and Radiation Protection.

The practice of environmental health thus has a long storied history in North Carolina. Preserving and improving the practice of environmental health is in the interests of all its citizens.
Chapter III

Problem Definition

The practice of environmental health in North Carolina and across the nation depends on knowledgeable and experienced practitioners working to identify and minimize or eliminate environmental hazards to the public health, supported by regulations that provide the framework for their valuable work. Environmental health practitioners work with a wide variety of agencies in addition to public health, including environmental protection, agriculture, building inspection and zoning, and educational institutions (ASTHO, 2005).

The integrity and effectiveness of environmental health practice has been diminished by a confluence of factors that have been generated by a shortage of qualified environmental health practitioners (ASTHO, 2005). This is due partly to an overall workforce shortage in public health that has created a leadership void in environmental health policy development, and program implementation (ASTHO, 2005; Deuel et al., 2004), but also the reluctance of local governments to invest sufficient resources in their environmental health programs. This has resulted in an inability of local departments to provide services, increased times to service delivery, and diminished environmental protection.

Onsite wastewater divisions of environmental health agencies have been most directly affected by these factors with some agencies having a backlog of several hundred applications for wastewater systems. Timelines of 8 to 12 weeks have not been uncommon (Long & Staley, 2006; Tillman et al.).

These events have precipitated a rash of legislation aimed at loosening environmental health protections. ("Enhance on-site wastewater system approvals", 2005, "Wastewater approvals / small counties", 2006). The authority of environmental health agencies is in some
bills subordinated to private firms. Such an eventuality, in the opinion of many public health professionals and environmental policy analysts, will undermine the protection of public health currently afforded by governmental administration of environmental health services (Garau & Sclar, 2004; Gollust & Jacobsen, 2006; Institute of Medicine, 1988; Keane et al., 2001a, 2001b, 2002a, 2002b; Keane et al., 2002c; Prizzia, 2002).

The concerns being addressed are those of contractors and developers, distressed by the long wait times for issuance of permits in some counties, and a lack of consistency of requirements among county programs (Long & Staley, 2006; Wilms, 2007a, 2007b). It may be instructive to note the composition of the legislative committees governing environmental and natural resources issues. Figure 1 shows that the primary occupations of members of the committees are attorney, real estate occupations, and business. There is not a member on either the House or Senate environmental committees who comes from an environmental discipline. Given this makeup, the legislative outlook may continue to be one that promotes the privatization of services of interest to the land development industry. In a move many in environmental health saw as a first step toward privatization, House Bill 1094 was ratified as Session Law 2006-136 ("Wastewater approvals / small counties", 2006). The law created a pilot program that allows licensed soil scientists to draw improvement permits and authorizations to construct septic systems in counties with populations less than 25,000 that have over 900 outstanding septic
system permit applications pending. This activity was, before passage of the bill, the exclusive responsibility of the local environmental health department. The bill prohibited local environmental health departments from reviewing the work of the soil scientist, but validates the work by requiring an environmental health specialist to sign the permits drawn by the private agent. If a local environmental health specialist does not sign the permits within 10 days, they are considered valid and approved. To forestall further movement in this direction, the time to issuance of septic permits by environmental health departments must be improved.

These problems are present not only in programs regulating water and sewage but in food and institutional programs as well. Initiatives to replace the North Carolina Administrative Code regulating foodservice establishments (North Carolina Department of Environment and Natural Resources Environmental Health Services Section, 2006) with the science based Food and Drug Administration Model Food Code have been met with resistance from both elements of DENR and the Commission for Public Health (Shinn, 2007). North Carolina remains one of four states that have not adopted the FDA Model Food Code (Figure 2).

The Commission for Public Health (CPH) recently reviewed a proposed rule changing hot and cold food holding temperatures. A provision lowering food cold holding temperature to

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3 The only county which met these criteria at the time of ratification was Cherokee.
41° F was deleted due to industry resistance. Industry concern over the necessity of new or upgraded equipment was the reason for the deletion, despite the fact that the rule was based on FDA Food Code requirements (Shinn, August 22, 2007).

In 2006 a draft of the child day care rules rewrite contained a provision allowing the maintenance of reptiles, a known vector of salmonella, as pets in child care centers. Two vocal proponents of the policy from day care organizations had insisted on its inclusion and planned to be at the Commission for Public Health hearing in support (Norman, July 21, 2005). Stringent opposition to the rule from environmental health practitioners in attendance, citing Centers for Disease Control data on salmonella outbreaks from reptiles, prevailed. The rule was deleted and an absolute prohibition of reptiles in child care centers enacted instead (Bolick, 2005; Commission for Public Health, 2005; Norman, July 21, 2005).

These examples underscore the need for competent, knowledgeable environmental health professionals working to protect the public health from environmental hazards, rather than depending on private vendors engaged in the free marketplace to provide protections within currently regulated industries. However, as the IOM noted, the environmental health infrastructure in the United States is one of “fragmented responsibility, lack of coordination, and inadequate attention to the health dimensions of environmental problems” (Institute of Medicine, 1988).

North Carolina is not an exception. The system of local health departments (LHD) independently enforcing state rules with disparate budgeting, staffing levels, and experience of personnel from county to county has led to inconsistent interpretation and enforcement of rules, widely varying response times, and the need for some to ‘triage’ program responsibilities to meet
political expectations\(^4\). The absence of an agreement among counties for standardized Onsite
Wastewater permits forms begets inconsistent requirements for and documentation of sewage
systems. The lack of a modern state automation system to collect and analyze data renders the
NC DENR incapable of assessing the performance and assuring the effectiveness of county
programs.

It is time for local and state environmental health leaders to come together and propose
performance measures to effect consistency of environmental health practice among local
departments.

Chapter IV

Literature Review

A. Accreditation of Public Health Departments

In 1988 the Institute of Medicine (IOM) produced the report *The Future of Public Health.*
In it the IOM called for the accreditation of public health agencies. The recommendation stated
that:

"The Secretary of the Department of Health and Human Services should appoint a
national commission to consider if an accreditation program would be useful for
improving and building state and local agency capacities. If such a system is deemed
useful, the commission should make recommendations on how it would be governed and
develop mechanisms to gain state and local government participation in the accreditation
effort" (Institute of Medicine, 1988).

Accreditation may be defined as "the periodic issuance of credentials or endorsements to
organizations that meet a specified set of performance standards" (Novick & Mays, 2001, p.765).

\(^4\) In some cases, this takes the form of deferring foodservice inspections to facilitate land development resulting in inadequate protection of the public health.
It is a rigorous evaluation of the key systems and processes of the accredited agency.

Accreditation is routinely performed in other health related disciplines. The Joint Commission administers accreditation programs in ambulatory care, assisted living, behavioral health care, critical care hospitals, home care, hospitals, laboratory services, long term care, and office based surgery. The National Committee for Quality Assurance accredits health plans, including managed care organizations, preferred provider organizations, and new health plans.

Previous accountability efforts in public health laid the foundation for accreditation efforts. Assessment programs such as the Assessment Protocol for Excellence in Public Health, and the National Public Health Performance standards, and strategic planning programs such as Mobilizing for Action through Planning and Partnerships, provided the building blocks for current work in public health accreditation (Thielen, 2004).

In 2004, the Robert Wood Johnson Foundation began to fulfill the vision of the IOM. In a stakeholders meeting held in December, the issue of whether accreditation of local health departments was feasible and worthy of further development was examined. Subsequently, the Robert Wood Johnson Foundation and the Centers for Disease Control and Prevention funded the Exploring Accreditation Project (Lenaway et al., 2007).

The Exploring Accreditation Project was coordinated by the Association of State and Territorial Health Officials (ASHTO) and the National Association of County and City Health Officials (NACCHO) (Turnock & Barnes, 2007) and included the American Public Health Association (APHA) and the National Association of Local Boards of Health (NALBH) (Bender et al., 2007). The group concluded that a system of accreditation of local health departments was feasible and desirable, and recommended the implementation of such a program (Benjamin et al., 2006). Washington and North Carolina were the first states to implement an accreditation
B. The North Carolina Local Health Department Accreditation Program

The ratification of Senate Bill 804 in the 2005 session General Assembly session mandated the creation of an accreditation program for local health departments ("Public Health Task Force/Accred. Recommend." 2005). The NCLHDAP now serves as the official accreditation program to meet the requirements contained in the general statute that the approved bill created, GS 130A-34.1.

In 2002 the North Carolina Division of Public Health and the North Carolina Association of Local Health Directors began development of a mandatory, standards-based system for accrediting local public health departments throughout the state.

The focus of the NCLHDAP is on the capacity of the local health department to perform at a prescribed, basic level of quality the three core functions of assessment, assurance, and policy development and the ten essential services as detailed in the National Public Health Performance Standards Program (CDC OCPHP, 2005; North Carolina Local Health Department Accreditation Program, 2007). The program focuses on a set of minimum standards that must be achieved to ensure the protection of the public health, but does not limit the services or activities an agency may provide to address specific local needs. NCLHDAP does not create a wholly new accountability system. It links basic standards to current state statutes and administrative code and the many Division of Public Health and Division of Environmental Health contractual and program monitoring requirements that are already in place.

The program comprises three functional components:

- An agency self assessment, which includes 41 benchmarks and 148 activities,
- A three day site visit by a multidisciplinary team of peer volunteers, and
• Determination of accreditation status by the North Carolina Local Health Department Accreditation Board.

The program process is adjudicated by an independent entity, the North Carolina Local Health Department Accreditation Board. Its members are appointed by North Carolina’s Department of Health and Human Services Secretary. The Accreditation Administrator (AA) within the North Carolina Institute for Public Health serves by legislative mandate.

Accreditation is achieved by appropriately meeting a set of capacity-based benchmarks as evidenced by documented completion of prescribed activities. Benchmarks may be met by either direct provision or assurance (through contracts, memoranda of understanding, or other arrangements with community providers) of required services and activities (North Carolina Local Health Department Accreditation Program, 2007).

C. Environmental Health Benchmarks in the NCLHDAP

Seven benchmarks in the Health Department Self Assessment Instrument include or address directly environmental health programs. Two of the benchmarks (7.6 and 8.2) include environmental health as a subset of LHD required activities, and five directly address environmental health programs, whether state-mandated or local. The standards related to EH are identified below.

Activity 4.2: The local health department shall monitor exposure to environmental health risks.

Documentation: Three of the following should be in place and dated within the past 12 months -- Well sample report, on-site wastewater survey, summary of childhood blood lead levels, general inspection data, water quality monitoring data (if applicable), or air quality monitoring data (if applicable).
**Activity 7.3:** The local health department shall investigate and respond to environmental health complaints or referrals.

*Documentation:* Complaint/referral log should include the following required information: if the complaint was justified, length of time to take action, and the presence of referral information if referred to another agency.

**Activity 7.6:** The local health department shall annually test or implement the local public health preparedness and response plan.

*Documentation:* Record of tabletop exercises including environmental health, full scale exercise, etc., OR a report of implementation dated within the past 12 months.

**Activity 8.2:** The local health department laboratory and external laboratories utilized by the local health department shall comply with all applicable federal regulations for clinical and environmental laboratory testing.

*Documentation:* List of laboratories used and their areas of certification.

**Activity 16.3:** Environmental health staff shall be trained in the implementation of laws, rules and ordinances that they enforce and shall have access to copies of the laws, rules and ordinances.

*Documentation:* Documentation of dissemination of rules.

**Activity 17.1:** The local health department shall conduct inspection and permitting activities for state mandated environmental health regulatory programs.

*Documentation:* Evidence of NC DEH program monitoring activities (Appendix A).

**Activity 17.2:** The local health department shall conduct inspection and permitting activities assigned to the local health department by local rules, ordinances, or policies.

*Documentation:* Evidence of local program activities (Appendix A).
These standards are general, without specific process metrics. The emphasis is on documenting the existence of programs, and evidence of activities within the programs, without qualifying quality, effectiveness, or actual completion of program activities.

**Activity 4.2** requires the monitoring of environmental health risks and documentation in the form of three types of reports confirming the activities, but does not contain requirements for action once a risk is identified.

**Activity 7.3** requires investigation of complaints, but contains no guidance on limits for "timely" investigation or procedures for complaints found to be justified.

**Activity 7.6** requires only that environmental health be included in preparedness drills and training.

**Activity 16.3** requires training of environmental health staff, but requires as evidence only that the rules have been "disseminated" to staff.

**Activity 17.1** requires that the LHD conduct inspection and permitting activities for state programs, but contains no requirements for inspection procedures, percentages completed, quality assurance, time-to-service, or documentation. The requirements for local programs in **Activity 17.2** similarly require only evidence of the local activities, without performance standards for their conduct.

An increased emphasis on performance measurement and quality improvement should improve the accreditation system, encouraging agencies to strive for higher standards of practice (Russo, 2007). Providing programmatic performance measures for environmental health as a part of the accreditation program will help to improve the quality of environmental health programs in local health departments and ensure consistency of practice among environmental health programs in local health departments.
D. Performance Measurement in Public Health

Traditionally, the primary measurement used to assess organizational performance has been a financial measure. For thousands of years bookkeeping records have told the tale of financial success. Financial innovations, to be sure, were responsible for the growth of large corporations such as General Motors. Economies of scale allowed companies that could successfully control and track financial measures to grow into corporate giants (Niven, 2003).

Performance measurement is the selection and use of quantitative measures of capacities, processes, and outcomes to develop information about critical aspects of activities, including their effect on the public. A performance measure is the specific quantitative representation of a capacity, process, or outcome relevant to the assessment of performance. A performance standard is a generally accepted, objective standard of measurement such as a rule or a guideline against which an organization's level of performance can be measured (Lichello & Turnock, 2000). Targets, which are goals to be achieved, and measures or indicators, which provide evidence whether or not goals have been reached, are often used in defining performance standards.

Some of the characteristics of a good performance system are that the information that is produced by the system is useful, accurate, feasible, and respectful (Oregon State University, 1998). To be useful, the information must be timely and relevant to the program. Accuracy of information is important to produce reliable procedures and reasonable interpretations and conclusions. Feasibility means that the collection of the information is conducted in a manageable manner, which remains stable over time. To be respectful the information collected must address worthwhile outcomes and contemplate the rights and welfare of participants (Oregon State University, 1998).
Many measures of performance have been utilized through the years:

- The basic six local public health services (1945)
- Optimal responsibilities of local health departments (1950)
- The eight basic services of local public health (1963)
- Model standards (1985)
- The three core functions (1988)
- Ten organizational practices (1990)
- Ten essential public health services (1994) (Lichello & Turnock, 2000)

Performance measures in public health today are usually derived from a) the three core functions of public health, developed by the Institute of Medicine, and first published in its 1988 *The Future of Public Health* (Institute of Medicine, 1988); and b) the ten essential public health services, developed by the U.S. Public Health Service’s (PHS) Public Health Functions Steering Committee and published in the 1994 in *Public Health in America* (Public Health Functions Steering Committee, 1994). The three core functions are assessment, assurance and policy development. The ten essential services of public health are:

1. Monitor health status to identify community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure a competent public health and personal health care workforce.

9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.

10. Research for new insights and innovative solutions to health problems.

E. The National Public Health Performance Standards

The three core functions and ten essential services have been incorporated into public health performance standards in the National Public Health Performance Standards (NPHPS) (CDC OCPHP, 2005). The NPHPS program is a collaborative effort of national partners representing the organizations and individuals that will use the performance standards:

- Centers for Disease Control and Prevention, Office of the Chief of Public Health Practice (CDC / OCPHP),
- American Public Health Association (APHA),
- Association of State and Territorial Health Officials (ASTHO),
- National Association of County and City Health Officials (NACCHO),
- National Association of Local Boards of Health (NALBOH),
- National Network of Public Health Institutes (NNPHI), and
- Public Health Foundation (PHF).

The NPHPS employs a Local Assessment Instrument comprised of ten sections – one for each of the ten essential services. Several “indicators” are employed for each essential service section. For each indicator there are model standards that indicate expected performance in a local health department. The standards are derived from opinions from experts in public health regarding programs and capacities that exist in local health departments that exhibit high performance. Answers to the queries can indicate levels of compliance with the standards;
"Yes" (greater than 75%), "High Partially" (50%-75%), "Low Partially" (25%-50%), and "No" (less than 25%).

Few of the indicators and standards in the NPHPS deal directly with Environmental health practice. The indicators addressing essential service #1, which requires monitoring of health status, includes questions (1.1.8, 1.3.1.11) that assess whether the LPHS has access to environmental health indicators and whether a registry of environmental exposures is kept. Indicators assessing essential service #2, requiring diagnosis of health problems, includes questions (2.1.2, 2.3.2, 2.3.4.3) that determine the capacity of the department to respond to public health emergencies, including environmental causes. In addressing essential service #4, mobilizing partnerships, the LPHS partnerships with outside environmental or environmental-health agencies is assessed (4.1.3.17). Similarly, in assessing essential service #5, policy development, #9, effectiveness of personal and population health services, and #10, linkage with institutions of higher learning, contacts with outside environmental or environmental health agencies is assessed. In addressing essential service #6, enforcement of laws and regulations protecting health and safety, the NPHPS examines environmental health services offered and whether the LPHS assesses the impact of such rules, identification of inadequacies in the laws and rules, and involvement of the LPHS in improvement of such rules. The indicators are documented in Appendix A.

As with the NCLHDAP, the NPHPS does not contain measures of quantitative assessment that would yield detailed information about the operation of environmental health services departments.

F. Existing Performance Measurement Systems for Environmental Health

A literature search yielded few instances of performance standards that were specific to
environmental health practice. Performance standards are being discussed, but most local jurisdictions do not have performance standards program in place to evaluate their environmental health programs (Mydlowski, 2007). Funding, the lack of a common framework, and the availability of a common data platform within which to collect data are common reasons cited for not employing performance standards in environmental health programs. The states of Alaska, Colorado, and Florida have, or are developing, working performance standards programs.

1. **The State of Alaska**

The State of Alaska Division of Environmental Health lists the following goals for its performance program: to establish clear standards; apply standards consistently statewide; permit, inspect and provide technical assistance; and enforce requirements. Two main outcomes are specified: protecting the environment from solid waste and pesticide pollution and protecting citizens from unsafe food and drinking water. Sample targets and measures of the program include:

- **Target:** 100% plan reviews are processed within specific turnaround times.
  - **Measure:** Percent of reviews processed within specific turnaround time.

- **Target:** Protective standards for food are complete by end of FY 2007.
  - **Measure:** Percent completion of food standards.

- **Target:** Within a fiscal year, less than 10% of regulated facilities have been issued formal enforcement.
  - **Measure:** Percentage of regulated facilities issued formal enforcement each fiscal year.
2. The State of Florida

The Florida Department of Environmental Protection’s Office of Strategic Projects and Planning (OSPP) has a program that aims to “perform assessment of program performance and environmental outcomes through the use of metrics and indicators” (Florida Department of Environmental Protection, 2008). An “Environmental Problem Solving” scheme is employed to:

- Identify the potential problem
- Define the problem precisely
- Determine how to measure impact
- Develop solutions
- Implement the plan with periodic monitoring and review
- Close case

Each quarter data collected on problems are analyzed and a rating of “Good”, “Watch” or “Focus” is issued. “Focus” areas are those with low compliance rates or deteriorating conditions and are closely monitored. A four-tier framework of indicators and measures is employed:

- Environmental and Public Health Outcome Indicators
- Behavioral and Cultural Measures
- Departmental Outputs and Activities
- Resources Efficiency

FDEP uses this system to analyze environmental impacts and outcomes as well as the public interests. Improving customer service, reducing the burden on the regulated community, and protecting recreational properties and lands that play a key role in the health of the environment are also aims of the program. By using cross program data facilitated by the Office of Strategic Planning, FDEP manages a quality improvement program that uses data
collected to identify areas for improvement in programs and processes and better protect the environment and public health.

3. The State of Colorado

In 2006, Division of Environmental Health in Colorado noted "a lack of focus on the environmental core functions and the 10 Essential Services of Environmental Public Health". In conjunction with the Colorado Department of Public Health, the Office of Local Liaison, and environmental health directors in Colorado, a state Environmental Health Action Team (EHAT) was formed to "cultivate a systematic way of implementing environmental health performance standards," based on the Protocol for Assessing Community Excellence in Environmental Health (PACE EH) (NACCHO, 2007), performance indicators, and program evaluation. Program evaluation methods are listed in Appendix C. No results of the program have yet been published. The EHAT was tasked with developing supportive resources to implement standards based on the 10 essential EH services.

Environmental health departments in the state were surveyed on program priorities, the 10 essential EH services, core competencies, barriers, familiarity with logic models and program evaluation, and regulation and policy development. For each of the 10 essential environmental health services, indicators were developed that were expected to build leadership that would work to establish priorities for EH agencies and identify strengths and weaknesses in programs (Appendix B). The expected results were more efficient, effective, sustainable, and prioritized EH programs. As a result of the program, the Colorado Department of Public Health actively supported the process, and adopted the evaluation tool.

4. The National Environmental Public Health Performance Standards

The Division of Emergency and Environmental Health Services at CDC's National
Center for Environmental Health has developed the National Environmental Public Health Performance Standards (NEnvPHPS) (Barron et al., 2007), which are modeled after the National Public Health Performance Standards (NPHPS). The program was piloted in June 2007 at the National Environmental Health Association conference in Atlantic City, NJ. Environmental health managers from state, tribal, and local environmental health programs participated in this workshop. By the end of the 1 1/2-day interactive workshop, participants had developed an action plan to improve their programs' capacity to perform the essential services of environmental public health as measured by the NEnvPHPS. Nationwide rollout is due in 2008 (Centers for Disease Control, 2007).

The NEnvPHPS is a set of ten standards modeled after the NPHPS, and based on the ten essential environmental health services:

1. Monitor environmental and health status to identify and solve community environmental health problems
2. Diagnose and investigate environmental health problems and health hazards in the community
3. Inform, educate and empower people about environmental health issues
4. Mobilize community partnerships and actions to identify and solve environmental health problems
5. Develop policies and plans that support individual and community environmental health efforts
6. Enforce laws and regulations that protect environmental health and ensure safety
7. Link people to needed personal environmental health services and assure the provision of healthcare when otherwise unavailable
8. Assure competent environmental health and personal healthcare workforce

9. Evaluate effectiveness, accessibility and quality of personal and population based environmental health services

10. Research for new insights and innovative solutions to environmental health problems

Each standard addresses one of the ten essential services, and an accompanying assessment instrument determines the extent to which each of the standards is met. The assessment instrument allows entries of “Fully Met -100%”, “Substantially Met 50%-100%”, “Partially Met 25%-50%”, “Minimal Activity 0-25%” and “No Activity 0%”.

The NEnvPHPS were developed, according to CDC, to address two issues: the need to clearly define standards for environmental health and to produce important information to strengthen environmental health. As noted earlier, the NPHPS addresses environmental health in relatively few standards. A separate set of standards for environmental health was judged to be of benefit to the evaluation of environmental health programs.

As with the NPHPS, the NEnvPHPS gathers information about the existence of programs for surveillance, diagnosis and investigation, education, partnership, policy development, enforcement, linkages, workforce development, program evaluation, and research. NEnvPHPS contains few metrics that would yield information useful to program managers in setting standards of operation and evaluating program outcomes.

5. The Northwest Center for Public Health Practice: Program Evaluation in Environmental Health

Others outside local, state and federal government agencies are also working to improve environmental health program evaluation. Carl Osaki (Osaki, 1999; Osaki et al., 2007), who contributed to the development of the NEnvPHPS, has been a leading proponent of performance
standards in environmental health. He is participating in a National Environmental Health Association sponsored training program on the NEnvPHPS. Osaki has developed a program evaluation training module for the Northwest Center for Public Health Practice in conjunction with the Regional Academic Public Health Center (Osaki, 2004). The module is self-paced, addresses the core competencies of information gathering, data analysis and interpretation, and evaluation. The goal of the training is to equip participants to:

- List and describe the six steps of an evaluation process
- Identify key stakeholders in an evaluation
- Describe the components and elements of a program logic model
- Outline a basic evaluation plan including data collection methods
- List three ways to use evaluation data to draw conclusions about a program

6. Applicability to North Carolina

These programs each have strengths that could be incorporated into a system of performance measurement and program improvement in North Carolina. The FDEP program underscores the importance of a unified system of information management that allows EH programs to track progress and identify areas for improvement, both internal to programs and in identifying areas into which the program should expand to protect the environment and public health.

The State of Alaska program uses a system of setting targets and using measures to define program standards that could be used in North Carolina to address the problems noted in an earlier section. Specific areas of concern would be identified with objectives, targets and measures that would quantify compliance,

The NEnvPHPS program and the Colorado program are very similar in using the 10
essential services of environmental health in building performance measures. Any system
developed for North Carolina could build on these systems to provide guidance for establishing
methods to improve the quality of services provided by EH departments. However, none of
these programs contains a comprehensive set of measures that are directly applicable to the
North Carolina environmental health system of practice.
Chapter V

Developing A System of Performance Measures for Environmental Health in North Carolina

A. The Need for Programmatic Performance Measures in Environmental Health in North Carolina

In the State of North Carolina NC DENR governs the majority of the practice of environmental health. NC DENR divides environmental health into two major sections. The Environmental Health Services Section (EHSS) governs food, lodging, institutions, public swimming pools, tattoo establishments, and child care centers. The On-site Water Protection Section (OWPS) governs septic systems, wells, and “non-point” sources of pollution.

Program evaluation activities in the two sections are intended to be conducted on a four-year cycle. In practice, this goal is not met. The EHSS conducted program evaluations for Catawba County in 1988 and 2004. The OWPS conducted its evaluations 1992 and 2005. An official report of the 1992 evaluation was never delivered to the department. Such widely separated program evaluations as occurred in Catawba County can do little to improve the practice of environmental health.

In the North Carolina system local health departments are responsible for maintaining staff authorized by the state to enforce the state rules and regulations for the programs administered by their environmental health programs. In an earlier chapter problems caused by this system were discussed. Beyond the issues of intentional or unintentional actions against rules or law, customer complaints point to a lack of consistency of interpretation among local environmental health departments, extended times for delivery of service, and poor quality of services. Without a means of assuring that services are delivered in an effective and consistent manner by local environmental health departments, these complaints will continue. Performance
measures addressing these issues could bring consistency among county departments and provide an increased level of service and protection of the public's health.

Disparities in staffing levels contribute to the long time to service delivery. Counties with more attractive employment packages can more easily hire environmental health specialists, and often hire EHS away from smaller counties that are disposed to hire trainees, often just after the employee has earned the Registered Sanitarian certification.

Juran noted that “every system is perfectly designed to achieve exactly the results it gets” (Juran, 1988). The environmental health system in North Carolina, then, is in need of a redesign. What is needed to begin to bring environmental health in North Carolina into a state of cohesion is leadership in proposing a set of program standards that are consistent from county to county. Since the NCLHDAP does not contain programmatic standards for environmental health, state and local public health leaders should address the problem by developing a set of standards that address the critical processes necessary to improve consistency, quality and customer service. To stimulate discussion and provide a potential template for such a system, a set of measures is hereinafter proposed.

In developing a set of performance measures for environmental health in North Carolina herein, the Balanced Scorecard method will be employed. The work of public health centers on our customer, the public, and the inclusion of a customer perspective in the Balanced Scorecard will allow this essential consideration to inform development.

B. The Balanced Scorecard

Realizing that financial measures, the traditional metric of performance through the industrial age, were inadequate to provide reliable feedback on the complex operations of modern corporations, Robert Kaplan and David Norton in 1990 embarked on a yearlong project
involving 12 companies that had operating, innovative performance measurement programs in place. Their work considered systems such as the Corporate Scorecard created by Analog Devices to measure delivery times, quality, cycle times, and new product development. The result was the Balanced Scorecard, which provides managers a fast, comprehensive view of the state of their business operations (Kaplan & Norton, 1992).

The Balanced Scorecard includes financial measures as a part of the analysis, but provides means to incorporate the customer perspective, the effect and demands of internal processes, and the need for learning and growth. This allows Balanced Scorecard users to look forward instead of relying on financial measures that merely indicate past performance. The four measures inform and guide the vision and strategy of the organization, as shown in Figure 3.

Kaplan and Norton also understood the need for simplicity. In developing performance measures, there is the danger of information overload. The Balanced Scorecard limits the number of measures employed, in order to provide succinct, easily understood data, which forces the recipient to focus on a small number of critical measures essential to successful operation (Kaplan & Norton, 1992).

The format of the Balanced Scorecard requires the user to consider all important
measures as a system, allowing managers to see where an increase in performance in one area may decrease performance in another. Kaplan and Norton note that even the best objective can be achieved badly. Implementing a crash staff education program (the learning and growth perspective) may take too much time away from performing tasks essential to everyday operations, and increase a backlog caused by an inadequate number of trained workers. Especially in government, where the financial perspective is controlled by factors other than the goal of maximizing profit, the systems approach is critical. To evaluate performance on the basis of how closely an agency toed the budgetary line or how much a department returned to the general fund at the end of the year says nothing about its overall performance (Kaplan & Norton, 1996).

Success for government agencies should be measured, Kaplan and Norton maintain, by how effectively and efficiently they meet the needs of their constituencies. Including the customer (or constituent) perspective is critical in determining performance of a government agency. The financial perspective can play an enabling or constraining role, but should not be viewed as the primary measure (Kaplan & Norton, 1996).

Paul R. Niven (2003) published a guidebook for implementation of the Balanced Scorecard in government and non-profit agencies. In modifying the Balanced Scorecard for government and non-profit organizations, the financial perspective was moved from the top domain, and replaced with the organizational mission. The customer perspective was placed directly beneath (Figure 4). The customer perspective flows from the organizational mission in government, not the financial perspective, as in industry. Niven notes that determining who the customer is can be the most perplexing aspect of elucidating the customer perspective in

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5 The core functions and essential services of public health are discussed above. For purposes of this exercise, the mission of public health will be considered as: “To protect the public health through the three core functions and ten essential services”.

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government and non-profit organizations. In environmental health this issue can be even more of a conundrum.

In Niven’s model, the financial perspective can be seen either as an enabler of customer success or as a constraint to be managed. The revenues and resources allocated to a public health agency determine the number and level of programs it can provide.

Environmental health can sometimes take a back seat to clinical programs. This requires environmental health managers to advocate forcefully for their programs, stressing the wide public health impact of the environmental factors regulated by their departments.

The internal processes of environmental health departments in North Carolina are informed and dictated by General Statutes, the North Carolina Administrative Code, policies, interpretations, and local ordinances and rules. Benchmark 18 in the NCLDHAP requires that policies and procedures for enforcement of public health laws but does not define or list the required content of the policies and procedures. The internal processes perspective of the Balanced Scorecard will help organizations identify those high leverage processes that will lead to improved outcomes for the customer.

The learning and growth perspective takes on a more prominent role in public health and environmental health with the workforce development requirements in benchmark 37.6 of the
NCLHDAP. Niven notes three areas for scrutiny: skill mix to meet challenges, information availability, and organizational climate (Niven, 2003). While the NCLHDAP benchmark requires a workforce development policy, as above, the benchmark does not provide specific requirements for the policy. The balanced scorecard will help organizations improve workforce development policies through the use of strategic system-wide measures of performance.

C. Developing a Balanced Scorecard for Environmental Health in North Carolina

As noted earlier, the majority of activities in local environmental health programs fall under the EHSS and the OWPS. The Balanced Scorecard developed herein will be confined to these programs. This list of objectives also will not be exhaustive. In developing this Balanced Scorecard, the original vision of Kaplan and Norton is followed, in which a limited number of measures are used, forcing managers to focus on the most critical issues (Kaplan & Norton, 1992).

1 The Customer Perspective

a. Who are our customers, and what do they expect?

In government, determining who the customer is can be one of the most perplexing aspects of operation (Niven, 2003). In the practice of environmental health, the proximate customer, a person applying for services or whose activities are being regulated by an environmental health department, is not the only customer. There are many customers to consider as a result of a request for service or a regulated activity. If the applicant for a septic system, for example, is the building contractor, the eventual homeowner should also be considered a customer. Neighbors in the vicinity of the home being built who may be affected by effluent runoff from septic system failure or whose wells may be contaminated are also customers. Further, anyone downstream of surface waters that may be contaminated by runoff or
leachate should be considered customers.

Similarly, in regulating the foodservice industry, the regulated parties are certainly customers, but the ultimate customers are those who consume the food that the foodservice establishment produces.

Customer concerns fall largely into four categories: timeliness, quality, performance and service (Kaplan & Norton, 1992). Including all customers in considering objectives is desirable, as the disparate needs and expectations of each will affect the success of any quality improvement initiative (Niven, 2003). Each customer in the above scenarios may assess these categories differently. The contractor may be primarily concerned with timeliness and service, while the neighbors value quality and performance in the protection of the public health. A restaurateur may value the service aspect: a professional, fair evaluation will be a highly desirable outcome. His customers will value timeliness, quality and performance in inspecting the establishment to protect them from foodborne disease.

b. Timeliness

Timeliness of service delivery is one of the customer concerns Kaplan and Norton (1992) posit. To define a performance standard for timeliness of environmental health services, the customer perspective is critical.

It has already been noted that, due to concerns in the legislature and among developers, a pilot program was established by a ratified bill ("Wastewater approvals / small counties", 2006) that placed a 10-day deadline on approval of septic systems submitted to the local environmental health department in counties where the law was in effect. A report by Long and Staley submitted to the North Carolina Association of Local Health Directors (NCALHD) indicated that many local environmental health departments had waits of 3 to 4 weeks for customers applying
for septic permits. The study noted that 70% of environmental health supervisors consider a wait of two weeks for an initial site visit to be unacceptably long.

When these factors are considered, the first objective for our balanced scorecard in the customer perspective emerges. This objective is tied to Activities 4.2 and 17.1 of the NCLHDAP benchmarks.

- Objective #1: Initial site visit times for septic system applications conducted within required period.
  - Measure: Time in days to first site visit.
  - Target: 10 days.

Another customer expectation of timeliness involves the investigation of complaints. This requirement is contained in activity 7.3 of the NCLHDAP. Complaints about food establishments often relate conditions that may cause the transmission of a foodborne illness. Complaints regarding septic failures involve conditions that may lead to the transmission of disease, contamination of a well, or surface waters. Activity 7.3 of the NCLHDAP does not provide a timeframe for response to complaints. The National Voluntary Retail Food Regulatory Program Standards (NVRFRPS) (US Food and Drug Administration, 2007) provides a benchmark for response to food-related complaints. That requirement is a response to a complaint on a foodhandling establishment within 24 hours. Since the possibility of disease transmission also exists in complaints regarding septic systems, it is wise to apply the same standard.

- Objective #2: Respond to complaints rapidly.
  - Measure: Number of hours until initial response.
  - Target: 24 hours.
c. **Quality**

The quality of services provided is a customer concern to which environmental health departments must pay special attention. Errors and omissions by environmental health specialists can have serious financial implications for property owners and the counties in which EHS who provide poor quality services.

Each LHD should have an internal quality assurance program that evaluates the work produced by its staff, identifies gaps and takes action to address them. Supervisors and administrators should review a statistically significant probability sample of inspections, permits, and other services each week to assure the work complies with generally accepted practices, relevant general statutes, rules, and regulations. A well-implemented quality improvement program will identify weaknesses in the system, and allow management to make adjustments in the process.

A simple method for determining sample size in small populations is

\[
 n = \frac{N}{1 + N(e)^2},
\]

where \( N \) is the number of permits processed and \( e \) is the desired precision (Israel, 1992; Yamane, 1967). If we specify a precision of ±5%, and the number of permits processed each year is 2000, the sample size would be 333, or about 28 each month. The objective for assuring quality, therefore, is:

- **Objective # 3:** Evaluate a valid sample of work produced.
- **Measure:** Percentage of error in work evaluated.
- **Target:** Zero percent error.

**d. Performance and service**

Customers of public service organizations value a transaction that can be completed in
one step (Niven, 2003). When obtaining environmental health services involves a complicated process, the customer estimation of the value of the department’s performance and services can be lowered. Many environmental health departments are located in locations separate from Building Inspection, Zoning, and Fire Marshal’s departments, making it necessary for the customer to go back and forth between and among the agencies to fulfill the requirements of each, before an application for environmental health services can be tendered. An objective that addresses this problem could be proposed as:

- Objective #4: Simple application and issuance process for environmental health services.
- Measure: Number of steps necessary to apply for and receive environmental health services.
- Target: One-step process for all services.

2. The Internal Processes Perspective

In the Internal Processes perspective, key processes at which the organization must excel in order to function effectively and efficiently are identified, and measures are developed that will track the organization’s progress and provide information for future action to foster improvement. The services an environmental health department provides, the skills and resources necessary to provide them, and whether these services are properly matched to the community are prime elements of the internal processes perspective for environmental health.

a. Skills, resources, and services

The ability of local environmental health programs to provide services will drive any other factors considered as part of the internal perspective. The ten essential services of environmental health and the NEnvPHPS have been discussed previously herein. As the top-
level domain of any internal perspective framework, the ability of a department to discharge its obligations is paramount. The NEnvPHPS provides a method to assess an environmental health department, and develop action plans for improvement. Therefore, objective one of the internal perspective is proposed as:

- **Objective # 1:** Local environmental health departments meet nationally accepted standards based on 10 essential services.
- **Measure:** Percent of "fully met" responses to indicator questions in the NEnvPHPS.
- **Target** 100% "Yes" responses to NEnvPHPS indicator questions.

b. Quality Improvement

Lag measures are an essential tool in assessing performance, but prospective measures (also referred to as lead measures) are also important. Whereas lag measures define where a program has been, prospective measures help to define where a program is going and provide a map for quality improvement.

Environmental health authorizations are extended to local environmental health specialists for activities that are a part of the EHSS, the OWPS, and the Children’s Environmental Health Section (CEHS). Local programs may enforce local ordinances regulating issues that are of concern in the community outside the programs authorized by the state.

In order to improve the quality of services offered by local departments, a standard method of community assessment that develops locally appropriate indicators should be employed. The PACE EH assessment is designed to systematically conduct and act on an assessment of environmental health status in localities (NACCHO, 2007). By employing PACE EH in local environmental health departments, a community’s need for additional environmental
health programs can be determined.

- **Objective 2:** Provide environmental health programs based on community need.
- **Measure:** Percentage of indicated community need addressed by local programs.
- **Target:** 100% of local departments meeting needs identified by PACE EH assessment.

As noted in Figure 1, North Carolina is one of four states that have not adopted the FDA Model Food Code, or a set of rules that provides a regulatory foundation consistent with the Food Code.

The Food Code is a science based model code developed by the Conference for Food Protection, the FDA, CDC, the U.S. Department of Health and Human Services, and the Food Safety Inspection Service of the U.S. Department of Agriculture. It is the product of the most current research in food safety, and is employed by the great majority of states. One prime expectation of the foodservice industry is consistency of enforcement. Adopting a set of rules meeting Food Code requirements would bring North Carolina into line with the most current science in food protection and the expectations of the foodservice industry. The VNRFRPS provides an audit tool that evaluates a jurisdiction’s code, regulation, or ordinance against the Food Code.

- **Objective 3:** Foodservice regulatory programs meet national standards.
- **Measure** Percent of “full compliance” answers on VNRFRPS audit tool.
• Target: 100% compliance with FDA Model Food Code.\(^6\)

e. Productivity

Inspections of foodservice and other establishments are governed by general statute and the administrative code. The Fees and Statistics Section of the Department of Environment and Natural Resources maintains records submitted by local environmental health departments relating to inspections. Monies are disbursed to counties based on the percentage of required inspections performed by the departments. Despite this incentive, many NC counties do not maintain a 100% inspection rate. The customer expectation in this regard is that environmental health departments should perform those actions necessary to assure the safety of foodhandling establishments that they frequent. It is from this expectation as well as activities 4.2 and 17.1 of the NCLHDAP that objective four is derived:

- **Objective # 4:** Maintain inspection rate for permitted establishments required by rules.
- **Measure:** Percentage of establishments inspected according to frequency required by rules.
- **Target:** 100% of inspections conducted according to required frequency.

3. The Learning and Growth Perspective

This perspective contributes to the infrastructure to accomplish the objectives set in the other perspectives. Three issues are important: employees’ capabilities, information systems, and organizational alignment (Kaplan & Norton, 1996). Most organizations developing a Balanced Scorecard find the Learning and Growth Perspective the most difficult section to

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\(^6\) The most effective means of ensuring full compliance with the FDA Model Code is to adopt *et sequelae* through legislation.
complete (Niven, 2003). The decentralized structure of environmental health in North Carolina, in which each local environmental health department is a separate entity with disparate concerns and needs, makes this perspective even more challenging to formulate.

The NCLHDAP provides some guidance in Benchmark 37, activity 37.6, in requiring that “The local board of health shall approve policies for the recruitment, retention, and workforce development of staff”. Variations in the interpretation of this requirement will necessarily lead to as many systems as there are local agencies.

A cohesive system of recruitment, retention and workforce development for environmental health in North Carolina is needed, in which the demands on the system in each local agency are met, providing a level of protection of the public health that is uniform, without respect to county lines.

Often, local environmental health agencies are understaffed, in large measure due to uncompetitive salary levels. Despite a sometimes booming development market, county governments may be loath to invest in personnel for environmental regulation. Without competitive employment packages recruitment will continue to be a major obstacle, which the Learning and Growth Perspective cannot address.

a. Employee capabilities.

The current system of workforce development in environmental health consists of a mandatory 15 hour continuing education requirement from the Board of Sanitarian Examiners. Environmental health specialists may choose from any offering from the NC Environmental Health State of Practice Committee, various other agencies, or submit a course for approval by the board. The sole requirement is that the course has a perspective relevant to the environmental health field. Courses are often chosen on the basis of proximity to the local
department or cost. Some EHS delay until late in the year and are constrained to attend ad hoc educational opportunities scheduled to provide hours for those short of the minimum requirements. This system does not facilitate development of the capabilities of EH staff in any organized way.

What is needed is a system that develops environmental health staff through educational programs based on the 10 essential environmental health services. The requirement should be based on completion of programs covering all 10 essential services within a specified period of time, whether for new employees or as continuing education. This program could be administered by the NC DENR Office of Education and Training, which is responsible for the Centralized Intern Training program and is positioned to oversee a program of this kind.

- **Objective #1** Workforce development program based on the 10 essential services.
- **Measure:** Percentage of courses completed by EH department staff based on the 10 essential services.
- **Target:** 100% of courses based on 10 essential services

b. **Information systems**

The information system for environmental health is not well developed. NC DENR EHSS has maintained its electronic records on the Health Services Information System (HSIS) since the mid-1990s. The electronic system replaced a paper-based system for Food, Lodging and Institutional inspections that, by account and observation, was limited to stacks of inspection sheets in a storage room.

Recent plans to move away from HSIS to a new system, the Health Information System (HIS), were met by NC DENR with a plan to institute a standalone information system, now
referred to as BETS (Best Environmental Tracking System). The move from the HSIS platform began in 2002 with a committee of state and local environmental health staff, and state information technology system staff designing a new system to meet environmental health program needs.\(^7\)

Tight budgets, difficulties in recruiting and retaining programmers, and retirement of key staff have stalled the implementation of this system. The system was scheduled to go online in August 2007. To date, the system is not online except for a pilot program.\(^8\)

Further, the BETS system is intended to handle only Food, Lodging and Institutional data. There is no existing or planned system of data management for the OWPS. Data collection by this section is limited to the submission of a monthly Excel spreadsheet of activities.

The availability of data to properly manage environmental health programs in North Carolina is critical. The state must provide an information management system that administers the programs it mandates in environmental health. Despite the enforcement of the statutes, rules, and regulations promulgated by state agencies being enforced by local departments, it is the obligation of the state to facilitate the operation of these departments by maintaining an information system.

- **Objective # 2** Statewide information management system provides data to assess performance of local environmental health departments.
- **Measure:** Number of local environmental health departments utilizing state information system.

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\(^7\) When the HIS system began to be discussed as an eventuality, the committee decided to recommend that the current HSIS data structure be converted to the new platform and incrementally built after launch. That was in April 2004. August 2004 was set as the prospective rollout date.

\(^8\) Third-party systems are filling the gap in environmental health data management. Custom Data Processing, Garrison Enterprises, and others are seeking to provide a data solution for local environmental health programs. One important issue is interoperability with the current and any future state platform. The delay of the BETS system only serves to further fractionate the information system landscape in environmental health.
Target: 100% of local environmental health departments utilizing system.

c. **Motivation, empowerment, and organizational alignment**

   Even the most skilled and highly motivated employees and departments will not achieve success if they are not provided funding and support (Niven, 2003).

   The adoption of any performance evaluation method requires that the organizational goals be aligned with the program to achieve any measure of improvement of process. Niven (2003) proposes a top-down rollout to organization’s management and cascading the scorecard approach downward within the organization. Since the subject of the performance measures proposed herein are independent agencies enforcing rules promulgated by the parent agency, the state, they can be considered as subunits of the organizational whole, and their management teams the “top management” under the “executive team” of the managers in the state organization. Thus, the adoption of the Balanced Scorecard by local environmental health agencies should be followed by NC DENR adoption as the means of performance evaluation for all Division of Environmental Health programs.

- **Objective 3:** Uniform program evaluation system for assessment of local environmental health programs.

- **Measure:** Percentage of programs in EH Departments utilizing
IV. The Financial Perspective

In order to provide quality services in a timely and efficient manner, departmental budgets robust enough to provide a sufficient staffing level to meet the objectives set in the Balanced Scorecard must be allocated by the county or state.

County governments are often reticent to increase taxes or user fees at a level that is sufficient to provide for the expanding role of environmental health. Traditional financial measures are "lag measures", providing information about where the department has been, not where it is going. The budget process in government is also cumbersome and slow to react to a changing economy, and to rapid growth within a community. This places strain on the ability of environmental health departments to provide the required services in timely manner. Problems with long wait times to permit issuance discussed above are evidence that the staffing levels of environmental health departments are below the levels necessary to meet the demands of their customers. In addition, salary levels for some counties may act as a barrier to hiring the necessary number of qualified staff.

a. Staffing levels

The NC DENR EHSS and OWPS each have staffing analysis tools that calculate the required number of staff for a local environmental health department. The tools consider factors such as the number of foodservice and other permitted establishments, the number of improvement permits and authorizations to construct requested by customers, the number of complaints lodged, need for continuing education, and many other factors relevant to the
workload of the department.

These analyses are performed as a part of the program evaluations conducted by the respective sections. The tools are available to county departments for use, however, and can be of great value in determining staffing requirement for the budget process. Since the Customer Perspective and Internal Processes Perspective each have objectives concerning timeliness and productivity, the Financial Perspective must contain objectives that address a level of staffing that will facilitate those objectives. Therefore, the first objective in the Financial Perspective is proposed as follows:

- **Objective # 1:** Staffing level enables the department to meet objectives for timeliness and productivity.
- **Measure:** Percentage of staff as defined in the NCDENR staffing requirements tools employed by the local department.
- **Target:** 100% of calculated staffing requirements.

b. **Budget**

Often, sufficient money is not available from the county general fund, and departments must assess user fees for those activities allowable under the general statutes. Fees can be assessed under the law for On-Site activities, swimming pool permits, tattoo permits, and foodservice establishment plan review. No fees may be assessed for any inspection related activity in the Food, Lodging and Institutional program.

In order to assure that sufficient funding is available to facilitate the objectives in the Customer Perspective and Internal Processes Perspective, a method that employs forward-looking perspective must be employed. User fees must be set at a level that contemplates the

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9 As noted above, the actual conduct of the evaluations is too far separated in time to provide timely information, and are lag based measures in the form they are conducted.
anticipated load for the forthcoming budget year. The philosophy of 100% recovery of
departmental cost meets this test. The portion of the departmental budget not covered by the
county general fund should be calculated based on the projected number of activities for the
forthcoming year, and fees set on the basis that all anticipated costs are recovered.\textsuperscript{10}

- Objective #2: Departmental budget facilitates level of staffing to meet objectives
  of timeliness and productivity.
- Measure: Percentage of required funding to provide staffing as defined by
  NC DENR staffing tools and resources to support that staff.
- Target: 100% of required funding.

The completed Balanced Scorecard for North Carolina Environmental Health is shown in
Figure 5. This is a small but ambitious Scorecard, which considers the most critical threats to the
practice of environmental health in North Carolina today. Implementing an evaluation method
of this type may be difficult, but will improve the state of practice, and address long-standing
problems that contribute to the disparate protection of the public health. These problems have
been of concern to local departments and their customers, and have created the movement in the
legislature toward privatization of services.

\textsuperscript{10} In the event that a county government fails to provide funding to hire sufficient staff to bring process times into
compliance and meet productivity requirements, the NC General Statutes contains a model for resolution in the
sections governing building code inspection departments. In GS §153A-351 a mechanism for assumption of
services by the state authority is defined. This statute provides that "In the event that any county shall fail to provide
inspection services by the date specified above or shall cease to provide such services at any time thereafter, the
Commissioner of Insurance shall arrange for the provision of such services, whether through personnel employed by
his department or through an arrangement with other units of government." A similar statute could be enacted
which allows state intervention for county environmental health departments failing to provide timely services.
Such services could be financed by withholding the costs from the county's sales tax or other disbursements made
from the state treasury.
Figure 5

The Balanced Scorecard for North Carolina Environmental Health

<table>
<thead>
<tr>
<th>Customer Perspective</th>
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<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>Initial site visit times for septic system applications conducted within required period</td>
<td>Time in days to first site visit</td>
</tr>
<tr>
<td>Respond to complaints rapidly</td>
<td>Number of hours to first response</td>
</tr>
<tr>
<td>Evaluate a valid sample of work produced</td>
<td>Percentage of error in work evaluated</td>
</tr>
<tr>
<td>Simple application and issuance process for environmental health services.</td>
<td>Steps necessary to apply for and receive EH services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Processes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>Local environmental health departments meet nationally accepted standards based on 10 essential services</td>
<td>Percentage of “fully met” responses to NEnvPHPS indicator questions.</td>
</tr>
<tr>
<td>Provide environmental health programs by providing services based on community need</td>
<td>Percentage of indicated community need addressed by local program.</td>
</tr>
<tr>
<td>Foodservice regulatory programs meet national standards</td>
<td>Percentage of “full compliance” answers on VNFRPS audit tool</td>
</tr>
<tr>
<td>Maintain inspection rate for permitted establishments required by rules</td>
<td>Percentage of establishments inspected at required frequency</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning and Growth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>Workforce development program based on the 10 essential services</td>
<td>Percentage of courses completed by EH department</td>
</tr>
<tr>
<td>Staff based on the 10 essential services.</td>
<td>Statewide information management system provides data to assess performance of local environmental health departments.</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Uniform program evaluation system for assessment of local environmental health departments.</td>
<td>Percentage of programs in EH Departments utilizing system.</td>
</tr>
</tbody>
</table>

**Financial**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Measure</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staffing level enables the department to meet objectives for timeliness and productivity</td>
<td>Percentage of staff as defined in NC DENR staffing tools employed by local department</td>
<td>100% of staffing requirements</td>
</tr>
<tr>
<td>Departmental budget facilitates level of staffing to meet objectives of timeliness and productivity</td>
<td>Percentage of budget requirement to provide staff required by NCDENR staffing tool, and resources to support.</td>
<td>100% of necessary funding.</td>
</tr>
</tbody>
</table>
V. Strategy

The implementation of a Balanced Scorecard for environmental health in North Carolina will, if history is a guide, be a complicated and difficult process. As noted above, a top-down model of organizational alignment is a preferred method of implementation; a bottom up strategy would continue the fractious and disparate methodology inherent the current system.

Senator Fletcher Hartsell is a leading proponent of improving the capabilities of local public health departments. He sponsored a bill in the 2003 General Assembly session, S672, Strengthen Public Health Infrastructure ("Strengthen public health infrastructure", 2003), which, among other requirements, would have imposed credentialing of the public health workforce. The language in the bill required “Certification or credentialing for the public health workforce: Consistent with any national system of public health workforce certification or credentialing, the State public health agency shall adopt and administer public health workforce certification or credentialing programs for members of the public health workforce. These programs shall be designed to develop knowledge, skills, and abilities in relevant and contemporary public health practice areas and must be based on: a. Basic, core, or technical competencies for public health workers; or b. Professional codes for public health professionals.”

An effort to institute a Balanced Scorecard method of program evaluation and quality improvement in environmental health must necessarily begin with similar legislation. This top-down method is critical to the first step in the process of improvement: providing an adequate budget in local departments to recruit, retain, and develop a workforce of sufficient size to meet the objectives and targets in the Balanced Scorecard. A legislative imperative that requires county governments to provide the funds necessary to staff their local environmental health departments according to a method that conforms to a standard timeline will ensure that the
process proceeds uniformly among all local health departments.

The strategy map in Figure 6 depicts how the top-down rollout of the Balanced Scorecard flows through the perspectives, flowing to the desired outcomes, customer satisfaction, and improved protection of the public health.
NORTH CAROLINA ENVIRONMENTAL HEALTH

Outcomes

Customer

- Initial site visit times for septic system applications conducted within required period
- Simple application and issuance process for environmental health services
- Evaluate a valid sample of work produced
- Respond to complaints rapidly

Internal Process

- Provide environmental health programs based on community need
- Maintain inspection rate for permitted establishments required by rules
- Foodservice regulatory programs meet national standards
- Local environmental health programs meet nationally accepted standards based on ten essential services

Learning and Growth

- Workforce development program based on the ten essential environmental health services.
- Statewide information management system provides date to assess performance of local environmental health programs
- Uniform program evaluation system for assessment of local environmental health programs

Finance

- Staffing level enables the department to meet objectives for timeliness and productivity
- Departmental budget facilitates level of staffing to meet objectives for timeliness and productivity
The practice of environmental health in North Carolina has a long and storied history, which began in the late 1800s, and continues today. The organization of the system, with local departments administering and staffing programs that enforce statutes and regulations promulgated by the state, however, is today disparate and inconsistent.

Problems with budgets, staffing, education of staff, and the ability of local departments to provide services in a timely manner have led the legislature to examine whether environmental health services of interest to the land development industry should be privatized. Niven (2003) notes that "having your functions outsourced to a third-party (private sector) provider is definitely an option these days, as taxpayers and funders continue to scrutinize how their dollars are spent and what results are coming of those investments"

The NCLHDAP was born of an initiative to improve the results of taxpayer dollars spent on public health services. Senator Fletcher Hartsell was one of the driving forces behind the NCLHDAP. He was concerned about the disparities in capabilities and services offered among local health departments. The initial bill proffered by Senator Hartsell had a component mandating credentialing of public health employees ("Strengthen public health infrastructure", 2003). The ultimately successful legislation had this provision removed ("Public health task force/accred. Recommend." 2005).

Many public health disciplines already have an accrediting authority separate from the NCLHDAP. Nursing programs, home health agencies, and laboratory services each have agencies that evaluate program operation on an ongoing basis to determine compliance with best practices for their respective disciplines. There is no similar program evaluation for environmental health in North Carolina. There is no workforce development program for
environmental health specialists that fulfills the requirements proposed in Senator Hartsell's original bill from the 2003 General Assembly session.

The existence of a county line should not mean that citizens on one side of the line should have a lesser expectation of protection of their health than citizens on the other side.

Development of a set of program measures for environmental health practice in North Carolina and the creation of a system of evaluation for environmental health agencies based on performance measures would assure consistency of practice among the local programs charged with protecting the public health through environmental regulation.

Local and state environmental health leaders should address these problems by proposing a performance measurement system that will address the disparities and inconsistencies among local environmental health departments and assure that the public health is uniformly protected, notwithstanding the geographic, demographic, or economic profile of the county where services are delivered.

Using a program evaluation method based on the Balanced Scorecard will allow environmental health to demonstrate results while improving efficiency (Niven, 2003). By identifying a few critical measures that will assure consistency of practice and congruence with accepted standards of practice, the disparities of practice among local programs can be eliminated and a verifiable standard of practice can be achieved in North Carolina.

The Balanced Scorecard for Environmental Health developed herein is not intended to be definitive or exhaustive. It was developed through use of experienced opinion, relevant standards contained in existing environmental health program evaluation systems, comparison to evaluation criteria in other disciplines, and recognized national standards.

Through advancement of discussion about program measures for environmental health,
perhaps a standard of consistency of practice that protects the health of all citizens of North Carolina equally can be developed and instituted. It is this eventuality for which this paper hopes.
ACTIVITY 17.1

SUMMARY OF STATE MANDATED REGULATORY PROGRAMS

ENVIRONMENTAL HEALTH

<table>
<thead>
<tr>
<th>PROGRAM TITLE</th>
<th>PROGRAM LETTER RECEIVED (YES/NO)</th>
<th>DATE OF MOST RECENT REVIEW</th>
<th>RESULT OF MOST RECENT REVIEW (MET/CAP NEEDED)</th>
<th>STATUS OF CAP* (IF APPLICABLE-ACCEPTED or NOT ACCEPTED)</th>
</tr>
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<tbody>
<tr>
<td>Food, Lodging and Institutions</td>
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<tr>
<td>On-site Wastewater** / Migrant Housing</td>
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<tr>
<td>Childcare Centers **</td>
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<tr>
<td>Childhood Lead Prevention</td>
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<tr>
<td>Tattoo Artists</td>
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<tr>
<td>Public Swimming Pools and Spas</td>
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<tr>
<td>Please list additional programs</td>
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* CAP = Corrective Action Plan

**locally developed permits must include requirements of state law
### ACTIVITY 17.2

### SUMMARY OF *LOCALLY MANDATED* REGULATORY PROGRAMS

#### ENVIRONMENTAL HEALTH

<table>
<thead>
<tr>
<th>LOCALLY-MANDATED PROGRAMS</th>
<th>OFFERED (YES/NO)</th>
<th>MECHANISM (ORDINANCE / POLICY)</th>
<th>ENFORCEMENT COMPONENT (YES/NO)</th>
<th>IF YES, ANY ENFORCEMENT ACTIONS IN PAST 24 MONTHS?</th>
</tr>
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<tbody>
<tr>
<td>Private well construction</td>
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<tr>
<td>Animal control</td>
<td></td>
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<tr>
<td>Indoor air quality (radon)</td>
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<tr>
<td>Tattoo artist permitting</td>
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<tr>
<td>Manufactured home park Ordinance</td>
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<td>Smoking in restaurants</td>
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<tr>
<td>Solid waste</td>
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<tr>
<td>Water quality</td>
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<tr>
<td>HAZMAT</td>
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<td>Lead risk assessment</td>
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<tr>
<td>Bioterrorism preparation</td>
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<tr>
<td>Disaster response</td>
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<tr>
<td>Minimal housing</td>
<td></td>
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<tr>
<td>Non-mandated food programs</td>
<td></td>
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<tr>
<td>Water sampling for underground storage tank leaks</td>
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<tr>
<td>Surveys for utility extensions</td>
<td></td>
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<tr>
<td>Public health pest management</td>
<td></td>
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<tr>
<td>Rodent and mosquito control</td>
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<tr>
<td>Public nuisance ordinances</td>
<td></td>
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<tr>
<td>Non-point source water pollution program inspection</td>
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<tr>
<td>Erosion control</td>
<td></td>
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<tr>
<td>Exotic animals</td>
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<td></td>
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</tr>
<tr>
<td>Please list additional programs</td>
<td></td>
<td></td>
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</tbody>
</table>
Appendix B

List of Environmental Health Indicators in the NPHPS

1.1.2 Does the LPHS compile data from the community health assessment into a community health profile?
   1.1.2.6 Community environmental health indicators?

1.1.8 Does the LPHS have access to community environmental health indicators?
   1.1.8.1 Are these data used in the CHP?

1.3.1 Does the LPHS maintain and/or contribute to one or more population health registries?
   1.3.1.11 Environmental exposures?

2.1.2 Does the LPHS monitor changes in the occurrence of health problems and hazards?
   2.1.2.4 Environmental hazards?

2.3.2 Does the LPHS have current epidemiological case investigation protocols to guide immediate investigations of public health emergencies?
   2.3.2.2 Environmental health hazards?

2.3.3 Does the LPHS maintain written protocols for implementing a program of source and contact tracing for communicable diseases or toxic exposures?
   2.3.3.2 Exposure to food-borne illness?
   2.3.3.3 Exposure to water-borne illness?
   2.3.3.4 Excessive lead levels?

2.3.4 Does the LPHS maintain a roster of personnel with the technical expertise to respond to potential biological, chemical, or radiological public health emergencies?
   2.3.4.3 Environmental health scientists?

4.1.3 Does the LPHS maintain a current directory of organizations that comprise the LPHS?
4.1.3.17 Environmental or environmental health agencies?

5.2.2 Does the LPHS review public health policies at least every two years?

5.2.2.2 Examination of potential community health impact of other policy areas (e.g., fiscal, social, environmental)?

5.3.1 Has the LPHS established a community health improvement process (e.g. MAPP)?

5.3.1.1 Is there broad participation in the community health improvement process?

5.3.1.1.17 Environmental or environmental health agencies?

6.1.2 Does the LPHS have access to a current compilation of federal, state, and local laws, regulations, and ordinances that protect the public’s health?

6.1.2.1 Food handling?

6.1.2.2 Water quality?

6.1.2.4 Injury prevention (schools, swimming pools)?

6.1.2.7 Nursing home and other long-term care?

6.1.2.9 Day care centers?

9.3.2 Is an evaluation of the LPHS conducted every three to five years?

9.3.2.3 Do LPHS entities participate in the evaluation of the LPHS?

9.3.2.3.17 Environmental or environmental health agencies?
Appendix C

State of Colorado Department of Public Health and Environment
Essential Environmental Health Services and Indicators

Essential Service # 1: Community Health Problems

Indicator 1.1: Population-Based Community Environmental Health Profile

Indicator 1.2: Utilization of Current Technology to Manage, Display, Analyze and Communicate Population Environmental Health Data

Indicator 1.3: Maintain Population Environmental Health Registries

Essential Service # 2: Diagnose and Investigate Environmental Health Problems and Environmental Health Hazards in the Community

Indicator 2.1: Surveillance of Environmental Health Threats

Indicator 2.2: Public Environmental Health Emergencies

Indicator 2.3: Respond to Public Environmental Health Emergencies

Indicator 2.4: Laboratory Support for Investigation Health Threats

Essential Service # 3: Inform, Educate, and Empower People about Environmental Health Issues

Indicator 3.1: Health Education

Indicator 3.2: Environmental Health Promotion Activities to Facilitate Healthy Living in Healthy Communities

Essential Service # 4: Mobilize Community Partnerships to Identify and Solve Environmental Health Problems

Indicator 4.1: Development of Constituencies

Indicator 4.2: Community Partnerships
Essential Service # 5: Develop Policies and Plans that Support Individual and Community Environmental Health Efforts

Indicator 5.1: Governmental Presence at the Local Level
Indicator 5.2: Public Environmental Health Policy Development
Indicator 5.3: Community Environmental Health Improvement Process
Indicator 5.4: Strategic Planning and Alignment with the Community Environmental Health Improvement Process

Essential Service # 6: Enforce Laws and Regulations that Protect Environmental Health and Ensure Safety

Indicator 6.1: Evaluate Laws, Regulations, and Ordinances
Indicator 6.2: Involvement in the Improvement of Laws, Regulations, and Ordinances
Indicator 6.3: Enforce Laws, Regulations and Ordinances

Essential Service # 7: Link People to Needed Environmental Health Services and Assure the Provision of Environmental Health Services when Otherwise Unavailable

Indicator 7.1: Populations with Barriers to Environmental Health Services
Indicator 7.2: Environmental Health Service Needs of Populations
Indicator 7.3: Assuring the Linkage of People to Environmental Health Services

Essential Service # 8: Assure a Competent Public and Environmental Health Care Workforce

Indicator 8.1: Workforce Assessment
Indicator 8.2: Environmental Health Workforce Standards
Indicator 8.3: Life-Long Learning through Continuing Education, Training, and
Mentoring

Indicator 8.4: Environmental Health Leadership Development

Essential Service # 9: Evaluate Effectiveness, Accessibility, and Quality of Personal and Population-Based Environmental Health Services

Indicator 9.1: Evaluate Population-Based Environmental Health Services

Indicator 9.2: Evaluate Personal Environmental Health Services

Indicator 9.3: Evaluate Local Public Health Systems

Essential Service # 10: Research for New Insights and Innovative Solutions to Environmental Health Problems

Indicator 10.1: Fostering Capacity

Indicator 10.2: Linkage with Institutions of Higher Learning and/or Research

Indicator 10.3: Capacity to Initiate or Participate in Timely Epidemiological, Environmental Health Policy, and Environmental Health Systems Research
Citations


Garau, P., & Sclar, E. D. (2004). You can't have one without the other: Environmental health is urban health. American Journal of Public Health, 94(11), 1848.


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