

Return on Investment Analysis: Local Public Health Funding

Strong Evidence for the Value of Population Health Investments



Michigan Association for Local Public Health

2013

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EXECUTIVE SUMMARY

The Michigan Association for Local Public Health (MALPH) is a member organization comprised of Michigan's 45 local public health departments. Each department seeks to carry out its statutory responsibility of preventing disease, prolonging life, and promoting public health through organized programs in its area of the state. These organized programs encompass eight vital public health operations: 1) immunizations, 2) sexually transmitted disease (STD) control, 3) infectious disease control, 4) hearing screening, 5) vision screening, 6) food safety inspection, 7) drinking water protection, and 8) on-site sewage management.

The State of Michigan has historically recognized the vital importance of public health services for the well-being of all Michiganders. The state has codified a cost-sharing formula into statute, so as to better share the responsibility of protecting Michigan's population health. Recent budgetary cutbacks have resulted in the state halting its obligation to fund half the cost of these activities. Although the economic recovery remains fragile, such drastic reductions in public health funding will harm the health and well-being of every Michigander. As this report will show, the essential services and other programs provided by local health departments across the state ALL have consistently strong returns on investment, ultimately saving money for patients, the healthcare system, and state government alike, while promoting the health of Michigan residents. Using data collected by local health departments and applying existing return on investment (ROI) research from scientific literature, this report estimates the ROI for the eight essential public health services. **In every instance, these services generate great value for the State of Michigan with ROIs ranging from 2 to 1 to as high as an astounding 162 to 1 (for vision screening).**

Table 1 – Summary of ROI estimates

Local Public Health Service	ROI (benefit per dollar invested)	Notes
Childhood Immunizations	\$22 to 1	\$88 Million saved in 2009
Flu Vaccinations	\$11 to 1	\$91 – \$141 saved per vaccination (direct medical costs only)
STD Screening	\$2.50 to 1	Through pelvic inflammatory disease prevention
Infectious Disease Surveillance	\$2.00 to 1	Considering ONLY bacterial meningitis prevention
Hearing Screening	\$112 to 1	From gains workers' future productivity
Vision Screening	\$162 to 1*	From life-long disability prevention for kids
Food-borne Illness Surveillance	Epidemic Prevention	187 cases occurred in 2009 (\$1.5 Million for treatment)
Drinking Water Protection and On-Site Sewage Management	Epidemic Prevention	Gastrointestinal outbreak, South Bass Island, Ohio

*The estimated ROI for vision screening based on use of Visual Acuity Screening (more robust). If Photoscreening is used instead, ROI drops to \$142 to 1²⁰

It is important to note that this report includes only a *sampling* of the activities of local public health departments. There are other services provided for which strong scientific evidence exists for significant ROI. While it is true that not all prevention or population health initiatives save money downstream (especially in the *clinical* realm), the public health services of local health departments focus on those services considered by scientists to be best practices. For this reason MOST local public health department activity creates significant ROIs.

It is also important to note that population (or public) health includes activities that are much broader than the eight essential services that local health departments are required to provide. Issues like motor vehicle accident reduction, obesity prevention, and air pollution mitigation all fall under the realm of public health. Most of these activities have demonstrated cost-effective returns on investments, while also improving people's health outcomes. Michiganders unknowingly rely, every day, on the professionals working to ensure our citizens' health at the systems-level. We must make it a priority to safeguard this first line of defense against disease.

Whoever wishes to investigate medicine properly should proceed thus: . . . first, consider the seasons of the year, and (their) effects . . . Then the winds. . . especially such as are common to all countries, and then such as are peculiar to each locality. We must also consider the qualities of the waters . . . (W)hen one comes into a city to which he is a stranger, he ought to consider its situation . . . and the mode in which the inhabitants live, and what are their pursuits, whether they are fond of drinking and eating to excess, and given to indolence, or are fond of exercise and labor, and not given to excess in eating and drinking¹.

-Hippocrates (c. 460 BC – c. 370 BC), the “Father of Western Medicine”

ESSENTIAL LOCAL PUBLIC HEALTH SERVICES Michigan’s First Line of Defense for Ensuring Health

Michigan’s 45 local health departments play a vital role in protecting the health of Michigan residents at the population level. In fact, their role is considered so important that Michigan law requires the state to provide a minimum level of funding for eight basic health services. Michigan statute mandates local health departments to

continually and diligently endeavor to prevent disease, prolong life, and promote the public health through organized programs, including prevention and control of environmental health hazards; prevention and control of diseases; prevention and control of health problems of particularly vulnerable population groups; development of health care facilities and health services delivery systems; and regulation of health care facilities and health services delivery systems to the extent provided by law².

Local health departments have several more statutory responsibilities:

- Implementing and enforcing laws
- Utilizing statistics and research to protect the public health
- Investigating cause of disease and especially epidemics
- Planning, implementing, and evaluating public health education
- Preventing and controlling environmental health hazards, diseases, and health problems of particularly vulnerable populations
- Having power to perform such duties and exercising that power.

While these duties may seem vast, eight basic services have developed which fulfill the statutory responsibility of local health departments. These services are 1) immunizations, 2) sexually transmitted disease control, 3) infectious disease control, 4) hearing screening, 5) vision screening, 6) food safety inspection, 7) drinking water protection, and 8) on-site sewage management.³ The state, recognizing that local health departments need resources to adequately provide such services, developed and codified a cost-sharing formula to fund the delivery of these services. **As of 1984, the state and local health departments were each required to fund half of these services.⁴ Despite this requirement, the state has not funded local health departments for these services at the statutorily required level in more than 15 years,** leaving local health departments to scramble for supporting funds from other sources, either through fees or from local governing entities. Funding for these eight essential services in the Essential Local Public Health Services (ELPHS) appropriation has decreased since

2003, when ELPHS received \$40.8 million. If ELPHS funding had been adjusted each year for inflation, ELPHS would currently be receiving \$47.6 million. In fiscal year (FY) 2008–09, however, the ELPHS appropriation was \$40.6 million for these mandated services (\$35.5 million General Fund; \$5.1 million School Aid Fund). If the state were meeting its statutory obligation, regardless of inflationary increases, ELPHS would have received \$66.8 million in FY 2009-10.

While allocating funds can be difficult in times of economic contraction, funding for public health services are exactly the kinds of investments that have greater need during downturns in the business cycle, while simultaneously providing great return on investment for the state, as the following examples in this report will demonstrate. Adequately funding public health makes clear economic sense because local health departments create value for Michiganders with benefits that directly lead to better health and lower health care costs. Yet, public health funding makes even more sense when one considers the long-term economic impact. Without a healthy and productive workforce, Michigan cannot generate economic growth. Local health departments across the state work tirelessly to promote health at the population level. **Investing in local health departments leads to enormous “bang for the buck” now and in the future.**

Immunizations

Immunizations are one of the most important tools in fighting and eradicating deadly infectious diseases. The importance of vaccinations cannot be overstated. The fear of polio, measles, and diphtheria is almost non-existent now because of our local public health childhood immunization program. Seasonal outbreaks of new strands of the flu virus can be quickly quelled with well-organized vaccination campaigns. Local public health departments play a vital role in educating the public on the importance of vaccinations, tracking and reporting the number of people who have been vaccinated, and distributing vaccines for emergency outbreaks.

Michigan’s local public health departments receive approximately \$4 million from the state to provide a comprehensive, statewide vaccination program that includes vaccine administration, technical support to private providers, and surveillance and reporting through the Michigan Care Improvement Registry.

Childhood immunizations provided \$22 in savings for every dollar invested

ROI for Childhood Vaccinations

Childhood vaccinations remain crucial in fighting the resurgence of deadly diseases. Routine childhood immunizations include DTaP (diphtheria, tetanus, and pertussis), Hib (Haemophilus influenzae type b), IPV (polio), MMR (measles, mumps, and rubella), and HepB (hepatitis B). In Michigan, more than 487,990 doses of these vaccines were administered by local health departments in 2012. Local public health departments record childhood immunizations so that children lacking proper vaccines can be easily identified. Health departments also work closely with schools and private providers to maintain appropriate vaccination coverage. The Centers for Disease Control and Prevention (CDC) reports that for every \$1 spent on these childhood immunizations in 2001, \$18.40 in savings were realized in direct and indirect

costs.⁵ Today that would be about \$22 saved for every \$1 invested*. Taking into account *only* the childhood immunization program, the amount of money saved in 2012 with a \$4 million investment would have amounted to more than \$88 million.

ROI for Flu Vaccines

Local public health departments' responsibilities for immunizations are greater than just childhood vaccinations. When the H1N1 strand of influenza began spreading at alarming rates in 2009, local public health departments had the sole responsibility of acquiring and distributing vaccines to the most vulnerable populations in the most expedient manner possible. Research conducted in 2009 estimated the savings incurred as a result of H1N1 vaccinations. Each H1N1 immunization saves between \$91 and \$141 in medical costs, depending on when the vaccination is administered.⁶

In 2009, every dollar local health departments spent on H1N1 vaccinations provided up to \$11 in direct and indirect savings.

In 2009, 1,483,233 people in Michigan received the H1N1 vaccine. Local health departments received \$19 million in federal emergency funds to coordinate the H1N1 vaccination program. The cost for each vaccination averaged \$13, and every \$13 invested in this program saved up to \$141. Accordingly, every dollar invested in this program saved up to \$11 in direct and indirect costs. Without a doubt, money spent on immunizations provides substantial economic returns.

Sexually Transmitted Disease Control

Local public health departments are required to provide screening for a variety of sexually transmitted diseases (STDs). Such screening is vital for the early treatment of infections and prevention of epidemics. Unfortunately, Michigan has seen an uptick in the number of reported STDs,⁷ paralleling a nationwide trend of increasing STD rates.⁸ In FY 2012, 63,874 cases of STDs were reported in Michigan, up from 60,892 in 2011. With early treatment, many of these can be easily cured without causing further health problems. The majority of STD screenings are for Chlamydia, gonorrhea, syphilis, and HIV.

Chlamydia and gonorrhea are two of the most common bacterial STDs occurring today, with Chlamydia the most frequently reported. Both Chlamydia and gonorrhea can lead to a number of serious health problems for women, including pelvic inflammatory disease (PID). PID is an infection of the uterus that can lead to serious health consequences including infertility, ectopic pregnancy, abscess formation, and chronic pelvic pain. The CDC recommends annual Chlamydia and gonorrhea screening for all sexually active women under the age of 25.

During fiscal year 2012, local public health departments conducted 42,739 screenings for Chlamydia and gonorrhea for both men and women. Of those, 5,983 (14%) received positive test results. Identifying people with STDs allows infected individuals to be treated, conditions like PID to be prevented, and lowers the risk that other people get infected. Early detection leads to better medical care and lower disease rates.

* Throughout this report, cost estimates are adjusted based only on the consumer price index and assume all other factors have remained the same.

Each dollar allocated for STD screening realized \$2.50 in savings.

From the total ELPHS funds for FY 2008–09, \$5.7 million was disbursed among local health departments for STD screening. It costs less than \$30 for each test. The economic impact of STD screening has been thoroughly studied, indicating significant savings. In 1998, researchers in Baltimore determined that up to 40% of untreated Chlamydia cases progress to PID.⁹ A similar study in 2000 determined that up to 40% of untreated gonorrhea cases can progress to PID.¹⁰ Treatment costs for PID averaged \$3,600 in 1998; adjusted for inflation, each case would have cost about \$4,800 in 2009. If 40 percent of the Chlamydia and gonorrhea cases identified and treated for women in Michigan in FY 2008–09 had gone undetected and progressed to PID, the costs associated with these diseases alone would have been about \$14.5 million. Therefore, each dollar allocated for STD screening through ELPHS realized at least \$2.50 in savings.

Infectious Disease Control

Local public health departments are the only central tracking source in the state for infectious disease incidence—all new cases of infectious disease are reported to local health departments for monitoring and investigation. Effective surveillance prevents or mitigates serious disease epidemics. The State of Michigan maintains a list of reportable diseases, including influenza, meningitis, and measles. Many of these diseases can impact vast portions of the population if and when they spread uncontrollably. Such outbreaks would have a hard to predict, but certainly large, fiscal impact on the state as medical expenses spike and economic losses ensue. Local health departments enter new diagnoses into a statewide tracking system each week; this tracking system allows for real-time monitoring and response to outbreaks. **In fiscal year 2012, there were approximately 83,500 cases of individual reportable diseases of more than 100 reportable disease types state-wide.**

Tracking reportable disease at the local level ensures proper identification and follow-up of diseases. Local health departments ensure that those affected receive appropriate treatment; track other people with whom infected individuals may have had contact in order to vaccinate, treat, quarantine, and educate them; and investigate and stop outbreaks. This surveillance helps public health authorities monitor incidence of reportable diseases, measure trends, assess and develop prevention and control strategies, and target at-risk populations for treatment. While surveillance is vital to control the spread of disease, it is also important to detect sudden changes in disease occurrence and distribution, so health professionals can understand why those changes occur. Once the sources and causes of disease are identified, adverse health outcomes can be prevented.

The CDC defines a reportable disease as one for which regular, frequent, and timely information regarding individual cases is necessary for the prevention and control of disease.¹² While many diseases on the list are of relatively little concern to many today (e.g., leprosy, plague, and polio), some are illnesses that continue to lower many people's quality of life. Meningococcal disease, commonly called meningitis, is one such illness. Meningitis is an inflammation of the tissue surrounding the spinal cord, and can be either viral or bacterial. Bacterial meningitis is more serious than viral meningitis, but neither can be definitively diagnosed without extracting tissue from the spinal column—a very costly procedure. Bacterial meningitis

can be treated with antibiotics; viral meningitis, although less serious, cannot be treated with antibiotics. Due to the difficulty of determining what type of meningitis a person has, antibiotics may be precautionarily administered until test results are available. If practitioners know about an increase in viral meningitis, they can treat for viral meningitis, instead of immediately ordering more expensive testing and treatments.

A study of a 1991 meningitis outbreak in Rhode Island estimated direct medical costs for 408 persons diagnosed to be more than \$585,000.¹³ Because of the difficulty of diagnosing meningitis, at least 359 patients were admitted to a hospital, although better coordination and communication about symptoms and diagnosis between the providers, public health officials, and hospitals could have prevented hospitalization. Only ten of these cases were bacterial infections; the overwhelming majority of cases were viral. On average, cost estimates for treating a person with bacterial meningitis are \$8,145.¹⁴ The authors of this study conclude that a more focused community response might have cut costs considerably because patients with viral meningitis do not benefit from expensive testing and treatment, like head CTs or antibiotics¹⁵.

Hearing Screening

Hearing screening for school-age children is standard practice in the United States. The Individuals with Disabilities Education Act of 2004 requires states to identify children with disabilities, including hearing loss. Michigan requires that children be screened at least once between the ages of three and five, and every other year up to the age of ten. Local public health departments fund the cost of the screenings in conjunction with the state. Some children pass an initial screening, but are still at risk for hearing loss that fluctuates, is progressive, or is acquired later in development. Hearing loss can affect a child's ability to succeed in school, and early intervention has been proven effective in minimizing the negative effects on learning. Hearing loss can also be an indicator for more serious disorders, including Hunter's syndrome, a neurodegenerative disorder.

In fiscal year 2012, local public health departments received \$5.125 million for hearing and vision programs. In 2012, local health departments conducted 447,217 hearing screenings¹⁶. Three percent of children screened were referred for follow-up. Early intervention for children with hearing loss has proven to significantly improve future development. Children with mild to moderate hearing loss, on average, achieve one to four grade levels lower than children with normal hearing.¹⁷ With appropriate management, teachers and allied health professionals can bridge the achievement gap.

Every dollar invested in hearing screening saves \$112 in future work productivity.

Untreated hearing loss costs about \$250,000 in a lifetime. According to a 1993 study by the Marion Downs Center, children who do not require special education save a school system as much as \$348,000 during a 12-year education. The lifetime costs of profound hearing loss, according to the Downs study, can total as much as \$1 million.¹⁸

75 percent of that amount is attributable to lost work productivity. On average, 0.3 percent of children have hearing loss.¹⁹ This would translate into 1342 of the children screened by local public health departments in Michigan in the 2011-12 school year. If these children receive assistance early, the overall

cost of hearing loss could be significantly reduced and could result in future work productivity savings of \$280 million. Therefore, each dollar spent on hearing screening (with appropriate intervention) can save \$112 in future work productivity.

Vision Screening

Local public health departments provide vision screening for school-age children. Health departments partner with the state to pay for vision screenings. Children are screened at least once between ages three and five years and every other year beginning with first grade, then through the ninth grade. Common eye conditions, such as decreased visual acuity and amblyopia, or “lazy eye,” can be detected with routine screenings and prevented by early treatment with eye care specialists.

Local health departments screened 564,019 children for vision problems in 2012; more than 56,900 children were referred for follow-up and treatment, or 10 percent of children screened. For FY 11-12, local public health departments received \$2.6 million for the vision screening program.

Every dollar invested in vision screening saves \$162.

Vision screening provides demonstrable cost savings. A study conducted in 2003 determined that all visual screening programs had a significantly positive benefit-to-cost ratio—the benefits of screenings exceeded the costs of screenings by a wide margin.

Every dollar spent on childhood visual acuity screenings saves up to \$162.²⁰ This finding would predict that the screening program in 2012 offered a benefit to the state of more than \$421 million with an investment of \$2.6 million.

Food Safety Inspection

Local health departments work with the Michigan Department of Agriculture and Rural Development (MDARD) to ensure the safety of food served in restaurants. The local health departments are responsible for the following activities:

- planning reviews
- conducting inspections
- processing license applications
- enforcing policies
- investigating complaints
- investigating foodborne illness outbreaks

MDARD provides evaluation, consultation, and training services to sanitarians in local health departments. In 2012, 194 full-time equivalent (FTE) inspectors conducted more than 85,586 inspections; 67 percent of those were routine inspections and the rest were follow-up or temporary food service activities. Each inspector conducts an average of 487 inspections annually.²¹

Local public health departments are responsible for investigation and follow-up when a suspected foodborne illness outbreak occurs. In Michigan, this is defined as an incident involving two or more cases, not in the same household, of people who have ingested a common food and have similar symptoms. In 2012, 109 potential foodborne illness outbreaks were identified. Of those, 30 were classified as probable foodborne illness outbreaks comprising 613 illnesses. Norovirus was confirmed as the cause of three outbreaks, clostridium perfringens caused two outbreaks, and salmonella was the confirmed cause of another three outbreaks, resulting in 187 cases of disease. The number of confirmed outbreaks and illnesses is low,

however, due to indeterminate conclusions from investigations. The cost of these illnesses can range from the price of a simple medical visit to more severe cases that result in hospitalization and even death. Research on the cost of salmonella suggests that in 1999 a physician visit for salmonella infection cost \$315.²² Adjusted for inflation, that medical cost would be \$408 in 2012. For more severe cases, researchers estimate costs for salmonella to be \$5,460,23 and for clostridium perfringens to be \$6,400.²⁴ That would work out to between \$7,000 and \$9,600 per case. These costs are for medical care only and do not take into account the cost to society from lost worker productivity.

The food inspection program is funded jointly by the state and through local fees and taxes. In 2012, the state allocated \$7.8 million with the remainder of the \$30.1 million program cost coming from local fees and taxes. Based on the number of illnesses identified and investigated with confirmed or probable cause (613 illnesses, using an average cost of \$8,300 per case), **medical costs can be estimated to be more than \$5 million. In the absence of state inspections and investigations that prevent outbreaks from occurring in the first place, these medical costs would be much higher.**

The state's investment to ensure food safety through local inspections and enforcement has provided enormous savings by guaranteeing timely inspection and follow-up. These measures prevent foodborne illness outbreaks and limit the impact when outbreaks do occur. This service protects the health of Michigan residents; moreover, food safety vigilance safeguards Michigan's tourist economy, allowing it to thrive.

Drinking Water Protection

Working collaboratively with the Michigan Department of Environmental Quality (DEQ), Local Public Health Departments implement drinking water protection programs including the Private and Type III Public Drinking Water Program (P-III) and the Noncommunity Public Drinking Water Supply Program (NCWS). **Approximately half of Michigan's population obtains their drinking water from groundwater source wells.**

In drinking water protection programs, local public health departments conduct pre-drilling site reviews to identify potential sources of contamination in the vicinity of the proposed drilling site. Well permits relay information regarding known and potential sources of contamination, well construction requirements, and water sampling. This "multiple barrier" approach effectively addresses the proper installation of safe drinking water supply wells. In 2012, local health departments conducted 12,598 pre-drilling site reviews and issued 13,171 well construction permits. In the same year, local health departments performed 6,247 post-construction final well inspections. Local health department staff, in cooperation with DEQ Environmental Health Section staff, worked directly with Michigan Registered Water Well Drilling Contractors to provide technical and regulatory guidance. During 2012, an initial well construction code conformance rate of 98.7% was accomplished in the P-III Program.

In the NCWS Program, local health departments also implement routine sanitary survey visits and continuously track federally-mandated water quality sampling requirements. Some examples of NCWS include schools, industries, restaurants, and campgrounds. Michigan has over 9,700 NCWS.

During 2011, there were 1008 Michigan NCWS water systems that were cited for at least one drinking water standard or monitoring violation, which would yield a combined compliance rate of 89.7 % on a state-wide basis. Local health departments then worked with these water suppliers to assure that appropriate water samples were collected or system corrections were made. Utilizing the Environmental Protection Agency's Enforcement Response Protocol, as reported in the federal Electronic Targeting Tool (ETT), the final drinking water quality and monitoring compliance rate for 2011 was 99.8% for the NCWS Program.

On-Site Sewage Management

Nearly one-third of Michigan's homes and businesses are served by On-Site Wastewater systems and the health of Michigan citizens requires that the state's groundwater and surface waters be protected. Effective systems for sewage disposal and vigilant testing of groundwater are two of the most important methods to protect Michigan's waters. Properly disposing of sewage has proven throughout history to protect populations from serious infectious illness, a dramatic public victory that has saved millions of lives. Diseases such as cholera and typhoid that were capable of destroying entire cities are no longer problematic in the United States. Local health departments work with the DEQ On-Site Wastewater Program to survey and approve potential sewage systems within their communities. While quantifying the value of effective sewage disposal and clean drinking water is difficult, the near eradication of diseases such as cholera and typhoid has contributed to the economic success of developed nations.

Public health efforts have made cholera and typhoid outbreaks a things of the past. However, health officials must still be vigilant against other infections, like *E. coli*. In Michigan, some bodies of water have been impaired due to lack of public health oversight, even though our vast reservoirs of quality freshwater set Michigan apart from the rest of the nation, providing a natural competitive advantage.

Many recommendations for protecting the watershed focus on the responsibilities of the local health department to (1) enhance and maintain ongoing water quality monitoring, (2) establish education programs for septic system owners, and (3) institute preventive and corrective action steps for nonfunctional septic systems. Protecting water resources keeps citizens safe, but also affects many sectors of our economy, including agriculture and tourism.

In 2012, local health departments issued almost 11,000 permits for residential septic systems, in addition to conducting 20,000 inspections and performing over 16,500 land evaluations for future sewage systems. Of the 11,000 systems that were permitted by local health departments, nearly 5,000 were permitted to correct failing systems that were impacting public health and the environment.

Historically, where local geology, waste disposal practices, well construction practices, and water sampling frequency have not been routinely monitored or have not been addressed in a coordinated manner, serious water-borne illness events affecting hundreds and in some cases thousands of people have occurred. **The 2004 water-borne illness outbreak at South Bass Island, Ohio in Lake Erie** is one example where the Centers for Disease Control (CDC) concluded that poor well construction practices, poor waste disposal practices, a vulnerable hydro-geologic setting, and lack of routine water sampling **resulted in**

1031 individuals contracting Campylobacter, Salmonella, Giardia, or Norovirus. In addition, *E. coli*, *Clostridium perfringens*, *Cryptosporidium* and *Arcobacter butzleri* were isolated from various water systems on the island.²² Similar geology and similar remote, but extensive, residential and recreational communities exist in many parts of Michigan. Local health departments, through their drinking water and on-site waste water management programs, are on constant guard to proactively identify and prevent water-borne illness. Overall, Michigan invests almost \$9.3 million annually in support of local health department efforts to ensure clean drinking water and appropriate sewage management. The money saved by preventing just one epidemic far exceeds the costs of these activities.

CONCLUSIONS

Our health departments' ability to (1) administer vaccinations, (2) monitor the spread of disease, (3) screen for STDs, identify (4) hearing and (5) vision deficiencies, (6) protect against foodborne illness, and (7) ensure the safety of drinking water and (8) sewage disposal all undoubtedly contribute to the health and safety of our communities. Communities with lower risk of contracting life-threatening illnesses enable Michigan's residents to contribute to the state's economic growth.

As demonstrated for each of the eight mandated public health services, the investment made by the state provides real economic value and saves money in both direct medical expenses and indirect costs from lost worker productivity. Based on the examples in this report, one can safely predict that every dollar invested in local public health activities creates significant cost savings for the state, while producing better health for Michiganders. Let us also remember that, in preventing and controlling epidemics and identifying and removing environmental hazards, public health *saves lives*. Unfortunately, the efforts of local health departments often go unnoticed by the general public and policy makers, alike. These are investments—in lives and in dollars—that Michigan cannot continue to neglect. **Without a doubt, strengthening local health departments strengthens Michigan.**

NOTES

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