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Strengths and Challenges of a Rural Ohio Public Health Department: Considerations for Effective Service Delivery and Emergency Preparedness

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Strengths and Challenges of a Rural Ohio Public Health Department:
Considerations for Effective Service Delivery and Emergency Preparedness

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Abstract

The local public health department is the main entity in cities and counties established to ensure the safety, health, and well-being of its community members. In many cases, particularly in rural areas, the health department may be the community’s closest access to health care, providing not only clinical care, but preventive services as well. These rural health departments have additional challenges that may not be experienced in the larger, more populated metropolitan areas. These challenges include lack of resources and funding that impact daily operations, expanded registered sanitarian responsibilities, and emergency preparedness difficulties with resource allocation and communication. Despite these challenges, it is of great benefit to study the overall operations of small health departments, including case studies of their emergency preparedness response plans, noting their unique strengths and how they overcome these hurdles to remain effective entities devoted to public protection and safety. This manuscript will describe an overview of the key sections in a rural local health department. Further, it will then focus on two case studies in emergency preparedness, providing an overview of a small rural health department’s strengths, weaknesses, opportunities, and threats in dealing with the H1N1 Influenza pandemic of 2009, and a West Central Ohio Regional Table Top Exercise of Ebola Virus Disease.

Keywords: rural, registered sanitarian, Preble County General Health District, emergency preparedness, H1N1 Influenza, Ebola Virus Disease
Overview of a Rural Public Health Department

The local health department (LHD) is the main entity in the United States established to ensure the safety, health, and well-being of community members (Salinsky, 2010). In many cases, particularly in rural areas, the LHD may be the community’s closest or only access to health care. LHDs have additional challenges which may not be experienced in the larger, more populated metropolitan areas. On the other hand, small LHDs may also have many benefits and advantages, due to their small size, that may be overlooked or unrecognized. Additionally, there is current but unresolved debate concerning LHD regionalization as a means of resource and cost savings, improving emergency response capabilities, and increasing public health capacity (Stoto, 2008). By gaining a comprehensive sense of the operational capacity of a rural LHD, in terms of capabilities, challenges, and daily operations, a better understanding of what the LHD can contribute to the community can be obtained.

Emergency management and local emergency preparedness often fall to the LHD for planning and exercising emergency operations. In any setting, during an emergency, numerous local, city, state, and even federal agencies may be called upon to provide resources and guidance. The LHD is the foundational platform upon which to begin emergency management and disaster preparedness. This review and analysis of the emergency preparedness of a smaller rural LHD during small-scaled emergencies demonstrates unique capabilities that its small size contributes to hazard management.

**Purpose and Scope**

Preble County, Ohio, is a rural agricultural county in Southwest Ohio (see Figure 1), with population of 42,000 (United States Census Bureau, 2015). Approximately 16,000 households reside in Preble County, with a per capita income of $18,444.00 (United States Census Bureau,
2015). The rural nature of this county provided an opportunity to study the delivery of Public Health services to a smaller community focused around agriculture and farming.

![Location of Preble County, Ohio.](source)

*Figure 1. Location of Preble County, Ohio.*

Source: Wikipedia, Preble County, Ohio (June, 2016)

The following observational analysis of Preble County General Health District demonstrates the challenges faced by a small rural LHD, outlining its abilities to overcome those challenges. The intent of this observational study is to provide information about how a smaller LHD must adapt to meet local, state, and federal requirements, albeit with numerous resource limitations. Additionally, this observational study sets the baseline upon which further analysis can be performed through comparisons with other small LHDs or with larger organizations.

Information for this observational study was collected via shadowing with staff members of Preble County General Health District. Data collection, patient care, and administrative processes were seen first-hand by staff members as they performed their respective duties in this LHD. Also, duties performed by staff members in the field setting were also observed. Throughout this observational process, numerous interviews with staff members were conducted.
to gain insight into the difficulties faced by a small rural LHD and how these difficulties were addressed.

**Health Department Overview**

Preble County General Health District (PCGHD) (see Figure 2) is a small organization comprised of 20 full- and part-time employees. Most of these employees serve in multiple capacities, as demonstrated in Figure 3 (E. Balster, personal communication, April 8, 2016). Access to health care is limited in Preble County. There are only four medical clinics and seven primary care providers. Consequently PCGHD serves as a source of primary care for many county residents. Clinical services offered by PCGHD include immunization services, prenatal care, women’s health, and Women, Infants, Local and Children (WIC) services. There is limited laboratory testing capabilities, devoted mainly to the prenatal services (S. Cottingim, personal communication, April 8, 2016; Balster, 2015).

*Figure 2.* Preble County General Health District, Eaton, Ohio. (Preble County General Health District, n.d.). Photo used with permission from E. Balster.
Figure 3. Organizational Diagram of Preble County General Health District.

Note: Created by C. Harris Graessle through personal communication with E. Balster.

The PCGHD maintains health and safety standards for the community. This is accomplished through the Environmental Health program, consisting of multiple inspections and the permitting process performed by the two Registered Sanitarians (RS). Registered sanitarians have a bachelor’s of science degree, must work in Environmental Health for at least two years, and then pass the Environmental Health Proficiency examination (Ohio State Board of Sanitarian Registration, 2008). Restaurants, bars, food vendors, and other food services must obtain appropriate permits through state authorities and must accordingly pass inspections by the RS. Additionally, the services provided by the RS at PCGHD include but are not limited to septic system inspections and permitting, water quality testing, well drilling permitting, nuisance inspections, and dog bite quarantine procedures.

Disease outbreak surveillance is monitored by the PCGHD Epidemiologist, who performs duties equally shared between Epidemiology and information technology. The Epidemiologist receives reports of disease burden by the local provider offices in the city of Eaton, as well as the state-wide computer tracking program (S. Wilford, personal
communication, April 8, 2016). In turn, daily tracking provides a constant updated picture of any potential outbreaks in Preble County or in the Southwest region of Ohio.

Emergency Management at PCGHD is a part-time position with shared responsibilities between the Emergency Preparedness Coordinator and the Health Commissioner. In addition to planning for disasters and emergencies in Preble County, the coordinator is responsible for maintaining documentation of regional and statewide plans, exercises, and emergency contacts.

Administrative services at PCGHD are performed by several part-time employees. Daily operations including customer service, front desk management, files maintenance, and billing are integral to any health department. In a smaller LHD, these critical functions may be performed by numerous individuals due to necessity. As such, this redundancy safeguards many of the key processes.

At PCGHD vital statistics remain mainly in paper form with proposed gradual transition to electronic format into a local database. However, birth certificates for the state of Ohio are electronically available, as they are scanned into the statewide electronic database at the facility of birth. Permits, vaccination records, and inspection documentation remain largely in filed paper format, necessitating file space and administrative oversight for maintenance. Additionally, these paper documents must be available to other state and regional authorities upon request.

Perhaps the most versatile position at PCGHD is the nurse manager (NM). The NM is functionally the cohesive element bridging clinical services and administration at PCGHD. Responsible for a variety of daily operations, the NM is also accountable for short-, medium-, and long-term strategic clinical planning processes. The NM contributes to clinical medicine in
the LHD, writes grant proposals, ensures the accreditation process is implemented, and assists with emergency management (N. Smith, personal communication, August 3, 2015).

The health commissioner is the administrative director of PCGHD and has the overarching responsibility for daily operations and ensuring that all processes and communications run congruently. The health commissioner is also a member of the city of Eaton’s board of commissioners. As the LHD representative to this board, the health commissioner ensures that city government recognizes potential community health and safety issues in their planning and policies. The health commissioner also elevates issues to regional- and state-level authorities as needed and becomes the conduit for reciprocal information.

**Clinical Services Provided by PCGHD**

Due to the limited number of pediatric clinics in Preble County, the PCGHD immunizations program is the most utilized clinical service offered by the health department (see Table 1). The vaccination program is coordinated by the NM, who ensures the grant-funding process is sustained for the employees, and maintains the actual vaccination program (N. Smith, personal communication, August 3, 2015).

Table 1

*Clinical Services offered at Preble County General Health District*

<table>
<thead>
<tr>
<th>Immunizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis Purified Protein Derivative (PPD) Placement and Check</td>
</tr>
<tr>
<td>Women’s Health Services</td>
</tr>
<tr>
<td>• Prenatal Checks</td>
</tr>
<tr>
<td>• Sexually Transmitted Infection Evaluation</td>
</tr>
<tr>
<td>Women, Infants, and Children (WIC) Services</td>
</tr>
<tr>
<td>• Nutrition Support</td>
</tr>
<tr>
<td>• Nutrition and Lactation Education</td>
</tr>
<tr>
<td>Laboratory Specimen Collection</td>
</tr>
<tr>
<td>• Hemoglobin, Anemia Checks</td>
</tr>
<tr>
<td>• Urinalysis, Protein and Glucose Checks</td>
</tr>
</tbody>
</table>
Depending on the season, the immunization clinic in this rural LHD vaccinates up to 20 children per day, especially at the beginning of the school year. Interestingly, with the implementation of the Affordable Care Act, federal funding for the immunization program ceased. As a result, LHDs have had to learn to bill private insurance companies, which have been a cumbersome process as no prior infrastructure for billing insurance companies previously existed (N. Smith, personal communication, August 3, 2015). In a larger health department, with greater staffing capabilities, full-time positions can be devoted to this billing process. However, on a smaller scale, such as rural PCGHD, staffing constraints prevent a full-time employee from being assigned to learning this daunting task. In order to solve this problem, several LHDs have combined efforts by collectively writing grant proposals to obtain program funding. The funds from one such grant for vaccinations are shared among Preble, Darke, Miami, and Shelby Counties LHDs (N. Smith, personal communication, August 6, 2015). The benefits of this shared arrangement are many. The participating county LHDs can learn from one another how to more efficiently manage their funding, how to administratively recoup funds from patients, what language to include in writing grant proposals, and how to streamline the billing process with the private insurers (N. Smith, personal communication, August 6, 2015). In this case, though challenged by lack of resources and personnel, the smaller LHDs have collectively united to help one another with issues as they arise, becoming as efficient as larger-scaled organizations.

Aside from the Immunizations Services, Women’s Health and Prenatal Care are perhaps the most utilized clinical services provided by PCGHD. Nursing staff at PCGHD, in conjunction with physician residents from Wright State University, conduct a weekly clinic providing obstetrical checks, limited laboratory testing, and physical examinations for female patients. Laboratory testing is limited to urinalysis via dipstick checks in the LHD clinic and blood draws,
with specimen transport to the local laboratory for hemoglobin and hematocrit checks, or occasional sexually transmitted disease testing. There are few private medical practices in Preble County, so this service is extremely valuable to the community (N. Smith, personal communication, August 3, 2015). Additionally, through resource sharing, medical residents in Family Medicine at Wright State University receive rural community health training that they might not otherwise have the opportunity to learn (Zink, 2010).

A stand-alone emergency department recently opened in Eaton, to service the region of Preble County. This has successfully bridged the gap of emergency services which were heretofore severely lacking. Previously, patients would need to travel to Dayton (OH) or Richmond (IN) for emergency hospital care, costing up to an hour in valuable transport time. Although this new emergency department has the full complement of services needed for an established emergency care facility, routine obstetrics and labor/delivery are not available. Despite a closer hospital across the state line into Indiana, most patients have to deliver their babies at Good Samaritan Hospital in Dayton, which is approximately 45 minutes away. This emphasizes how valuable the clinical services are at PCGHD in terms of helping patients plan their delivery and prepare for their birthing process. Although the weekly obstetrics clinic provides excellent prenatal care for these patients, there is a paucity of information available to the gaining hospital for delivery due to the lack of an electronic health record. Additionally, different resident physicians participate in these weekly clinics, thus decreasing the continuity of care provided by physician staff. However, this continuity is provided by the nursing staff, who become very familiar with their patients, which makes the patients more comfortable with their overall obstetrical care (N. Smith, personal communication, August 3, 2015). This further emphasizes the importance of the LHD staff in ensuring education and care of their patients.
WIC is a federally-funded program under the United States Department of Agriculture, Food and Nutrition Service (2016) that provides grants to the states to distribute food to lower income women who are pregnant or who have children up to age five. WIC is primarily a standardized supplemental nutrition program providing food for lower income children. However, WIC also includes nutrition education, breastfeeding support, and clinic visits to ensure proper growth of the enrolled children. Typically, in a larger metropolitan area, the WIC clinic is a stand-alone facility. However, in Preble County, the WIC office is physically co-located with PCGHD, which provides greater convenience of its more rural patients, as many needed services may be accomplished in one location. The WIC office is staffed by two nurses who provide services for their enrolled patients. They ensure the children are growing appropriately, by conducting physical examinations, utilizing growth charts, and through checking hemoglobin levels in the children to detect iron deficiency anemia. The nurses collect blood samples from their enrolled children, which is then transported to a contracted laboratory for testing. The nursing staff manages the results for the anemia testing for their patients, and ensures the patients receive appropriate follow-up visitation as needed.

Given the small, rural agricultural community of Preble County, the WIC office provides an extremely valuable service for the community. The small size of this clinic confers great benefit to the area, in that patients and the staff are familiar with one another, which can positively impart help to those families in greatest need (M. Wilson, personal communication, August 5, 2015). This smaller and more cohesive community relationship likely would not be possible in a larger densely populated area. This constitutes still another benefit of a smaller LHD.
Environmental Health and the Registered Sanitarian Responsibilities

Perhaps the most traditional roles of public health fall under the current heading of environmental health, performed in Preble County by its two registered sanitarians. Recalling the numerous infectious disease outbreaks plaguing many countries at the turn of the century, (cholera, typhoid fever, and tuberculosis) the discipline of public health began to take shape via early investigators that have become public health icons (Mukherjee, 2010; Moeller, 2011). Recognized by many as the “Father of Public Health”, Dr. John Snow performed classic studies concerning the environmental exposure leading to the cholera epidemic in the middle 1800s (Moeller, 2011). These early practices in environmental epidemiology set precedence for modern day environmental health practitioners, the registered sanitarians.

The role of the registered sanitarian (RS) is very diverse, encompassing responsibilities ranging from food inspections to septic and well inspections, to the quarantine of dogs for controlling the spread of rabies. In a larger LHD, these responsibilities are delineated and separated by the RSs. Therefore, in a larger LHD, the RS gains expertise only in that one specific area of assignment. In contrast, the RS servicing a smaller community constrained by the lack of resources gains knowledge and expertise in all the environmental areas. Accordingly, the RS in a small rural LHD becomes the “catch all” for any unplanned or unexpected tasks that arise (G. Walker, personal communication, August 7, 2015). PCGHD has two full-time RSs who maintain numerous programs to ensure the health and welfare of those in the surrounding community.

Food inspections. The RSs are responsible for food establishment inspections twice annually, as required by the Ohio Department of Health (ODH) (2015b) and the Ohio Department of Agriculture (2016). From mobile food vendors at the county fair, to food sold at
gas stations and full service restaurants, the registered sanitarians inspect these services twice annually. Food inspection results are maintained by the LHD and are posted on-line (G. Walker, personal communication, August 7, 2015). Significant violations that remain unrectified are reported to the ODH (2015b) for remediation.

**Water quality testing.** Water quality testing is a significant responsibility for the RS, and may range from testing the water from a newly drilled well to checking the water quality from a customer complaint. Ensuring the public’s safety in consuming water is a paramount responsibility for the RS, and therefore, the entire health department, since any failure in the chain of events that allows water contamination is a direct reflection of the LHD and more importantly, the health commissioner (G. Walker, personal communication, August 7, 2015).

In the event that the RS needs to test a private homeowner’s well water, the RS collects tap water from the resident’s faucet in a sterile fashion. This is done after allowing the water to run for five minutes to ensure any pipe or faucet-based contaminants will be flushed away. Then, through meticulous flaming of the metal faucet outlet, the RS ensures that any bacterial contamination is removed. Water is then collected into sterile cups and transported to the water department’s laboratory, for coliform testing (coliform bacteria are one of the most common contaminants of medical concern). The results are usually available in 24 to 48 hours. The RS then informs the resident if any remediation needs to be done (G. Walker, personal communication, August 10, 2015). In the case of private residential wells in Preble County, water testing positive for coliforms indicates ground contamination and bleach-shock will be conducted. This entails adding chlorine bleach into the well, allowing it to settle for a few hours, and then opening every water tap in the home (e.g., sinks, shower, dishwasher, sink sprayer, toilets). The RS will then repeat the water quality testing to see if the bleach-shock eradicated
the coliform contamination (G. Walker, personal communication, August 10, 2015). It should be noted that in Preble County, there is a fee assessed for this water quality treatment service, which is a source of revenue generated for the LHD (G. Walker, personal communication, August 10, 2015). This process is therefore beneficial for the citizens in maintaining water quality, while also helping to fund the health department. Additionally, this demonstrates the flexibility that is required in a smaller, rural LHD in obtaining resources to help maintain productivity and ensuring these essential programs remain operational.

Given the primarily agricultural nature of Preble County, many people elect to build their own homes. Due to lack of public sewer systems in many rural areas, another critically important element that the RS monitors is the septic system installation process and maintenance. Waste processing is vital to maintaining good quality surface waters, rivers, lakes, and streams (Moeller, 2011). The expanse of Preble County is such that most of the residents have private wells and septic tanks, rather than public water and sewer. The septic system basically accomplishes what a water treatment facility performs, but on a small residential scale (Moeller, 2011). In Preble County, the RS accompanies a home builder to the proposed septic system site, and ensures that the allotted space between the septic tank and the proposed well drill site is adequate to prevent contamination (G. Walker, personal communication, August 10, 2015). Additionally, the RS takes into account the terrain, the quality of the soil, the grade of the land, and the surrounding properties in proposing designs for septic tank or well layouts. In these cases, the RS is central for planning proposed systems and can actually grant private citizens permission for septic system installation as a ‘certified operator’ (via an examination administered at the LHD, in accordance with state guidelines) (Ohio Environmental Protection
Hence, in addition to the routine duties of the RS (and probably more evident in this smaller LHD) the RS also becomes an educator to community residents.

**Nuisance complaints.** Nuisance complaints arise from citizens’ concerns over issues which may pose a health hazard to the community, such as garbage accumulation, stray animals, and condemned buildings. Nuisance complaints are a forum for private citizens of a community to raise concerns about issues that may impact the health and safety of the whole community. It is the responsibility of the RS to investigate each nuisance complaint to determine its validity, to determine if the alleged complaint presents a health or safety threat to the community, and if the issue warrants an immediate fine through the county commissioners’ office (G. Walker, personal communication, August 10, 2015). Often this has the potential to place the RS in a difficult situation, due to the small population served, where everyone is known to the LHD. The RS has at times even been placed in unsafe situations, with hostile individuals, or in unclean, hazardous environments (G. Walker, personal communication, August 10, 2015).

Waste, trash, and garbage scattered in an individual’s yard is perhaps the most commonly observed nuisance complaint made to the PCGHD (G. Walker, personal communication, August 10, 2015). In these instances, the RS investigates the complaint and informs the resident that a complaint has been made about the condition of the property, sometimes placing the RS in a precarious situation when the individual is angry about the complaint. Upon interview with a PCGHD RS about dealing with hostile situations, the RS replied that he attempts to stay neutral, to provide the person only the facts about the complaint, and offer methods to fix or alleviate the situation in a non-threatening manner (G. Walker, personal communication, August 10, 2015). He further stated that he never enters an environment where he does not have an immediate escape option and will not place himself in undue danger from environmental threats, people, or
animals (G. Walker, personal communication, August 10, 2015). Both RSs at PCGHD have a vast amount of experience in performing sanitary duties and utilize one another’s expertise in managing difficult cases.

With this in mind and given the expanse of the rural areas in Preble County, it is easy to surmise that the rural setting could allow for many unsafe situations. Since this is an agricultural community with lots of undeveloped land, old barns housing large farm equipment, and many residents who are not used to uninvited visitors on their property, the daily duties of the RS are not to be taken for granted. Situational awareness and constant vigilance is necessary when accomplishing some of the tasks expected of the RSs at this LHD.

**Animal bite program.** Animal bites are a serious threat to the health and well-being of the citizens in a community. The concern for rabies, though low for the state of Ohio, is regarded with extreme seriousness by the PCGHD (Ohio Department of Health [ODH], 2015c). Given the rural environment of Preble County, dog bites are more likely to occur than in a more urban area, and this problem is followed and investigated by the RS. Upon notification by the emergency department where the patient presented following the animal bite or via self-reported to the LHD, the RS completes notification paperwork informing the animal owner of the event and need for quarantine. An investigation ensues, during which the animal is observed by the owner in home quarantine for a period of ten days. The RS examines the animal before and after this quarantine period to ensure that rabies is not present (G. Walker, personal communication, August 10, 2015). As with other nuisance complaints, the RS must exercise personal safety so as not to incur a dog bite.

**Permitting process.** The RSs generate revenue for the PCGHD through the permit process. In addition to food vendors, permits are issued for numerous activities such as
installation of new septic systems, aeration systems, well drilling, swimming pool operations, camp-site operations, buildings, or additions to permanent structures. These permit fees augment state funds that are provided to PCGHD for operational costs (N. Smith, personal communication, August 6, 2015). With permitting processes, the RSs inspect the septic systems and aeration systems, swimming pools, and camp-sites annually to ensure they are well functioning and that there are no health or safety concerns for the public.

With the diversity in responsibilities and flexibility of the RSs, the role of the RS constitutes the backbone of the LHD. This is magnified given the small community served in Preble County, as the RS becomes familiar with every aspect of his/her public health responsibilities. But this also has the disadvantage of familiarity, demonstrated when citations or fees are assessed to people known personally by the RS. It is difficult to give citations or reject a well, septic, or building proposal of people that have been known by the LHD staff for years. The RS relationships in the community give them more opportunity to educate citizens to correct nuisances quickly by imparting more personal attention, with the goal of faster compliance and better outcomes. As a result, the RS develops diplomatic skills in helping to alleviate these problematic issues.

**Epidemiology**

Disease tracking and surveillance is performed by a part-time epidemiologist at PCGHD. Local medical clinics are required to report specific diseases to the LHD in accordance with the Ohio administrative code, which allows the LHD to forward this information to local and state authorities (ODH, 2016a). The epidemiologist also receives weekly reports from the ODH concerning outbreaks or potential disease clusters in Ohio. This information is then
communicated to the health commissioner for short- or long-term strategic planning and action (S. Wilford, personal communication, April 8, 2016).

The epidemiologist at PCGHD also functions as the department information technology specialist, ensuring the computers and software are up to date, that connections to state databases remain functional, that the staff are properly trained, and that troubleshooting and security of computers is streamlined. Although the majority of administrative information at PCGHD is maintained in paper files, there are plans to digitize these records as funding becomes available (E. Balster, personal communication, April 8, 2016).

**Emergency Management and Preparedness**

The emergency manager (EM) is arguably one of the most integrated and integral positions in PCGHD. In today’s uncertainty with global and domestic terrorism, climate change leading to extreme weather events, and unstable city/county infrastructures, the position of EM has taken on increased importance. Planning for the most probable emergencies in the community is a daunting but necessary task for health and safety, especially with limited funding and resources (Kapur & Smith, 2011; Lindell, Prater, & Perry, 2007). Emergency preparedness planning is usually coordinated with the city managers as well as those at the county level, including local fire fighters, law enforcement, and emergency medical personnel (S. Cottingim, personal communication, April 8, 2016). This also enables regional coordination, such as the South Central Ohio Region, to occur with state and federal agencies.

PCGHD has a part-time EM, responsible for planning, training, and coordinating among other agencies in the city of Eaton and Preble County area. In an effort to streamline and standardize overall emergency response, the ODH, in conjunction with the Federal Emergency Management Agency (2014) has allowed a more linear process for emergency planning through
record keeping and binder creation with standardized tabs. This standardized organization enables each county and city emergency manager to illustrate their specific plans to each tabbed binder section, while maintaining overall similarity to the state-wide established process. The emergency response coordinator at PCGHD maintains customized plans in the binder and periodically reviews them for currency and accuracy (S. Cottingim, personal communication, April 8, 2016). Additionally, these plans were submitted to the Public Health Accreditation Board (PHAB) (2015; 2016) as part of their successful accreditation application process.

In Preble County, several different types of emergency and disaster response plans have been developed for the most likely scenarios for this smaller, rural, agricultural community (Balster, 2015). Natural disasters due to weather, infectious disease outbreaks, nuclear/biological/chemical releases, and mass fatality accidents are considered the most likely emergencies to be encountered in Preble County (Balster, 2015). Coordination with surrounding counties and larger metropolitan areas is required due to the limitation of resources in this small rural geographic location. To overcome this disadvantage, the PCGHD emergency coordinator maintains a roster of key agencies so that this communication and partnership can occur at any given moment (S. Cottingim, personal communication, April 8, 2016). What PCGHD lacks in resources, it makes up for in the ability to coordinate quickly with key agencies. With everyone at PCGHD usually involved, everyone has open lines of communication, and all work together, maintaining a familiarity within each organization (N. Smith, personal communication, April 8, 2016). Additionally, the state-wide emergency recall service is available via cell phone and e-mail, to which all local first responder agencies subscribe.

After the planning and coordination process has been established, the next critical step is practicing the plans. Practice, in the form of table top exercises involving numerous surrounding
counties has occurred regularly, with feedback and lessons learned documented in after-action reports (S. Cottingim, personal communication, April 8, 2016). Scenarios such as infectious viral disease outbreaks and active shooter situations have recently been conducted within the South Central Ohio Region, including Preble County and PCGHD. Again, despite the small size of the county, and its inherent limited resources, the ability to communicate rapidly among the fire department, emergency medical services, emergency management, and law enforcement is an advantage.

**Administrative Overview**

The LHD maintains critical information concerning the community it serves in the form of vital statistics, such as population data, births, and deaths. At PCGHD, birth certificates, death certificates, vaccination records, permit receipts, and other important documents are available mainly in paper format. State level information such as birth certificates has been digitized into a database maintained by the ODH (2015a; 2016b). Anyone who was born in the state of Ohio can go to any LHD in the state and request a copy of his or her official birth certificate. Vaccination records at PCGHD are gradually being transitioned to electronic format, but the majority of these records currently exist in paper form. Such a filing system is only possible due to the small size of Preble County. Such a system would not be possible in larger LHDs that service greater sized communities. Small fees are charged for these requests to augment state-delegated funds to each health district (N. Smith, personal communication, August 3, 2015).

Funding for overall operations is overseen by the NM. In addition to guiding daily operations for clinical services, the NM is responsible for numerous other programs and duties, including grant proposals and grant writing. The positions of many of the employees at PCGHD are funded through state-distributed grants that must be strategically applied for at the county
level on strict schedules (N. Smith, personal communication, August 3, 2015). Grant appropriations will be distributed to other counties if this task is neglected. Hence, many people rely upon the NM at PCGHD for job continuity.

Employment security is only one aspect of grant proposals. Numerous clinical programs and agencies rely upon timely grant applications such as the Immunization Action Plan, Help Me Grow, Child and Family Health Services, Reproductive Health and Wellness Program, and Bureau for Children with Handicaps (N. Smith, personal communication, April 8, 2016; ODH, 2010). Without these state-funded grant programs, children in Preble County would have diminished access to many critical health and developmental services. Unlike larger organizations, the lack of this grant funding would be of greater adverse impact in this rural community which does not have other funded programs or collaborating agencies to cover the needed services.

Additionally, the NM together with the health commissioner was instrumental in collecting information, formulating processes, and submitting data for their PHAB application that was approved in May 2016. The dual nature of the NM position combines clinical services with administrative oversight to create an excellent basis upon which to answer the accreditation questions of the PHAB. Preparation requirements for the PHAB consisted of documenting local health demographics of the population served, collecting a variety of community statistics, as well as demonstrating the institution of local community outreach programs at PCGHD (PHAB, 2015). Information from a variety of sources was gathered into one collective and cohesive document outlining the PCGHD’s work. The NM utilized interviews, surveys, hospital and clinic data, and other sources for the PHAB submission. Significant recognition is due to PCGHD for its early submission of a complete and successful PHAB application, as many
counties in this region have not begun this arduous process. This enormous feat would not have been possible without the diligence and extraordinary efforts of the NM.

The health commissioner (HC) is directly responsible for the overall daily operations of the health department. The HC is also a member of the board of commissioners for the city of Eaton, ensuring a voice on issues of public health concern in the community (E. Balster, personal communication, August 3, 2015). As one of the city commissioners, the HC brings a public health and safety perspective to city planning and city affairs. For example, during discussions with the city of Eaton concerning expansion of the public sewer lines, the HC was able to impart ideas and safety concerns for the residents of Eaton and Preble County, such as increased costs of the city water supply and potential contamination through terrain drainage (E. Balster, personal communication, August 10, 2015).

The HC attends numerous committee and board meetings including the Preble County Mental Health and Recovery Board, an agency that works to decrease the prevalence of drug abuse in the county. Other committee members include representatives of the hospital, fire department, law enforcement, and volunteers. Collectively, this committee works toward education of the local public on the severity of drug abuse and its continuing ramifications, as well as options for battling drug abuse (Balster, 2015). The HC plays a vital role in providing the committee with data and outreach support by the PCGHD, thus helping to decrease the drug problem in Preble County.

Though LHDs vary tremendously in their size, location, population served, resources, abilities, and funding, creating a safer and healthier environment for their communities served is their foremost goal. This is apparent at Preble County General Health District. With creative initiatives and diligence, PCGHD has been able to successfully protect its rural community from
numerous public health threats while maintaining a high level of communication with their county and city partners.

The following case studies illustrate the challenges, and more importantly, the benefits of a small rural LHD, and how it overcomes these challenges during infectious disease outbreaks through a well-developed, organized, and practiced emergency response plan. Utilizing a tool often used in strategic planning, an analysis of PCHGD’s strengths, weaknesses, opportunities, and threats (SWOT) is illustrated by each case (Osita, 2014).

**Case Study: Preble County General Health District’s Emergency Response to the H1N1 Pandemic Influenza Virus Outbreak**

The outbreak of Influenza H1N1 was a significant pandemic viral illness occurring globally, creating significant burden of illness and disease on the world population. Using modeling studies by the Centers for Disease Control and Prevention (CDC), it has been estimated that 61 million cases of H1N1 influenza occurred in the United States between April 2009 and April 2010, resulting in 274,000 hospitalizations and 12,470 deaths (Kim, 2016). This H1N1 pandemic has been associated with up to 400,000 respiratory deaths and 180,000 cardiovascular deaths during this time (Kim, 2016). The first reported pandemic H1N1 influenza testing by the World Health Organization (WHO) occurred during the week of April 25, 2009 (Brammer et al., 2011). By May 2009, the H1N1 influenza virus had been detected in 23 countries, with an incidence of 2,099 new cases worldwide (World Health Organization [WHO], 2009). During this time, Mexico reported 1,112 confirmed cases with 42 deaths, and the United States reported 642 confirmed cases with 2 deaths, causing the declaration of a Public Health emergency (WHO, 2009). The illness exponentially increased, with 214 countries reporting confirmed H1N1 cases by June 2009 (Kim, 2016).
Clark County was the first county in the West Central Ohio Region to have a confirmed case of H1N1 in May 2009, followed by Preble County in July 2009 (Couse, 2010; ODH, 2010). The Preble County Emergency Management Agency and the PCGHD Incident Command System were formally activated and began weekly meetings to discuss surveillance results, planning for education via the media, and planning for vaccination strategies pursuant to the ODH guidelines (Couse, 2010). The CDC and the ODH provided guidance to the LHDs, and accordingly, the epidemiologist at PCGHD constantly monitored the statewide computer database to ascertain the location of the reported H1N1 cases (ODH, 2010). Given the relatively slow spread and low mortality of this viral infection, the emergency response program at PCGHD was able to successfully manage the public concerns for this pandemic through reassurance and public education (S. Cottingim, personal communication, April 8, 2016).

From August through October 2009, there were increased reports of local school absenteeism and influenza-like illness in Preble County (Couse, 2010). The Emergency Response team at PCGHD began numerous public outreach education initiatives such as school briefings, education provided to physician offices, and fire department staff briefings concerning occupational exposure, personal protective measures when dealing with the public, and recognition of signs and symptoms of influenza (S. Cottingim, personal communication, April 8, 2016). The PCGHD Emergency Response team had not yet received the vaccine product, nor had it been instructed to begin vaccinations for H1N1, so this public education phase was a preemptive measure to lessen worries in the community and assure the public that their health department was maintaining vigilance (Couse, 2010).

By October 2009, the first shipment of H1N1 Influenza vaccine arrived at PCGHD from ODH. Unfortunately, only 200 doses were initially received, for the entire county of over 40,000
Due to the limited availability of the vaccine, ODH (2010) issued strict mandates for the vaccine to be used only in certain high risk individuals. A collective decision was made by the emergency preparedness team at PCGHD to not publicize the receipt of this limited supply of vaccine based upon problems observed in other neighboring counties, such as crowding from citizens wanting the vaccine and public outrage that not enough vaccine was available (N. Smith & S. Cottingim, personal communication, April 8, 2016). Instead, PCGHD Emergency Response team took the initiative to organize their regional partners the Medical Reserve Corps, the Community Emergency Response Team (CERT), the local physician offices, Preble County Mental Health and Recovery Board, the West Central Ohio Regional Academic Nursing Coalition, and the local pharmacies to prepare for the anticipated pandemic to arrive in Preble County (Couse, 2010; Balster, 2015). Part of this preparation included reallocation of the small cache of antiviral medication received through the state of Ohio from the Strategic National Stockpile, to the local participating pharmacies to distribute as needed (N. Smith & S. Cottingim, personal communication, April 8, 2016).

The PCGHD Emergency Response team began strategic planning for the vaccination of Preble County residents in anticipation that more vaccine would became available from ODH. The initial plans included utilizing a local church to be staffed with volunteers from the community. Working alongside the Medical Reserve Corps and CERT Team, these volunteers were educated to provide immunizations to the public. One full day of clinic per week was designated for this vaccination service (Couse, 2010).

The first immunization clinic for H1N1 Influenza was conducted on October 27, 2009 (Couse, 2010). The PCGHD Emergency Response team, in conjunction with their local partners, vaccinated 1,575 people on this day. It was soon realized that the location of this clinic did not
provide enough space for mass vaccinations. Therefore, the next immunization clinic on November 3, 2009 was staged at the Preble County Fairgrounds Expo Building. During the second clinic, 1,130 people were vaccinated. With such large numbers of people in one location during the span of one day, it became obvious that logistical issues such as parking, traffic flow, and safety were concerns. The PCGHD Emergency Response team coordinated with the local law enforcement, emergency medical service, and the Preble County Sheriff’s office to aid with traffic flow and pedestrian flow, allowing a safe and successful vaccination clinic to occur (Couse, 2010).

A noteworthy accomplishment of the Emergency Response team was its plan for logistical support of patients with disabilities (Couse, 2010). Designated parking areas were delineated for passenger vans to bring disabled patients for their vaccinations and nursing staff went to these locations so the patients did not have to exit their vehicles to receive their immunizations. Point of distribution (POD) medications were also distributed to the four nursing homes in the county, with education provided to the nursing home staff for vaccinating their residents (Couse, 2010).

PCGHD conducted these weekly clinics for H1N1 immunizations until December 17, 2009, vaccinating over 7,000 people (Couse, 2010). It is important that every employee at PCGHD participated in these vaccination clinics, whether clinical or administrative, full-time or part-time. But even more noteworthy is the adaptability of this health department, in that it successfully vaccinated a significant portion of the Preble County population, prevented community anxiety through continuous education, outreach media support, and maintained a full complement of public health services, never ceasing the department’s normal operations during these immunization clinics (N. Smith & S. Cottingim, personal communication, April 8, 2016).
SWOT Analysis

Through a more comprehensive analysis of PCGHD’s strengths, weaknesses, opportunities, and threats (SWOT analysis) during this pandemic response, the advantages of a smaller more rural health department becomes evident (Ramezanpour, Pronker, Kreijtz, Osterhaus, & Classen, 2015).

Strengths. PCGHD excelled during this pandemic influenza emergency response. PCGHD was able to reduce the public anxiety that was observed in the larger neighboring counties, and successfully vaccinate all comers (N. Smith & S. Cottingim, personal communication, April 8, 2016). This feat was accomplished through a strategic and organized approach and preparedness of key team members before the waves of influenza passed through this region of Ohio. Given the relatively slow spread of H1N1 influenza, the emergency response team had sufficient time to plan and prepare for implementing the guidance given by ODH and the CDC. The incident management team was created early on and held weekly advisory meetings to ensure that all key players had the necessary information (Couse, 2010). Organization and planning were key elements that fostered success.

PCGHD’s early use of media support was an excellent choice, given the rural nature of Preble County (Couse, 2010). After the first case of H1N1 Influenza was identified in Preble County on July 15, 2009, an Immediate Public Health News Release was provided to local media, giving information and instructions concerning prevention of this viral illness (Couse, 2010). Throughout this pandemic, numerous public health news releases were produced and media viewed television interviews with the HC. This reassured the citizens of Preble County that their health and safety were forefront and that this pandemic illness was being constantly monitored. This also provided information to those in rural areas who might not be able to travel
to attend town hall meetings, to visit medical clinics, or to attend other public forums to receive the information. Thus PCGHD’s early use of a variety of media platforms enabled excellent communication with their residents.

The small size of Preble County was beneficial in responding to this public health issue. The members of the emergency response team reported that all agencies represented during this response knew each other (some on a personal level) which allowed for faster communications via cell phones and emails and easier team building (S. Cottingim, personal communication, April 8, 2016). Thus, a fast and cohesive overall response was achieved in this rural county.

Prior planning for POD of vaccine to nursing homes was greatly beneficial for the community, as well as for PCGHD, and provides still another example of the successful preparedness for this rural emergency response team. Staff at the four nursing homes in Preble County had already been trained in performing the immunization procedure. Vaccine product was distributed to the facilities and the staff took the responsibility to ensure all residents were appropriately treated. This decreased the logistical problems involved with the transport of elderly patients, and also decreased these patients’ exposure during the H1N1 pandemic (Couse, 2010).

**Weaknesses.** As previously stated, only 200 doses of H1N1 vaccine were made available initially, which was likely distributed by the ODH (2010) based upon population size. Not a weakness on the part of PCGHD, this is a limitation forced upon the county by the state authorities solely based on population demographics (ODH, 2010). Although the small size of Preble County proved to be mostly beneficial, its small population density perhaps prevented needed resources from being distributed for the county’s use during the pandemic (ODH, 2010). Although in the end PCGHD did a phenomenal job vaccinating approximately 7,000 community
members, this initial lack of vaccine product prevented the emergency response team from vaccinating even a higher percentage of the county population.

Additionally, due to the strict guidelines mandated by ODH governing the initial stratification of risk, many people in local emergency response occupations were concerned that they were not among the initial group to first receive the vaccinations (Couse, 2010; S. Cottingim & N. Smith, personal communication, April 8, 2016). Law Enforcement was not included in this first echelon of immunization strategy, as determined by ODH and the CDC, which created concern among this occupational group. In fact, a deputy sheriff in Preble County died from the influenza illness, which led PCGHD to include their law enforcement personnel in this first echelon of vaccinations despite other contrary guidance (S. Cottingim & N. Smith, personal communication, April 8, 2016).

**Opportunities.** There are ever broadening avenues for mass communication through social media that did not exist in 2009 given the success of the media in this event. The PCGHD Emergency Response team now has an updated Facebook page, with the HC working as the integrator of this networking forum (E. Balster, personal communication, August 10, 2015). Twitter and Instagram strategies have also been incorporated by PCGHD’s Information Technology specialist and the HC. The emergency response team intends to capitalize on social media and the greater expansion of media coverage for future public health issues, thereby reaching more people through these methods. Of course, for the many older residents who are less keen on these platforms, traditional methods of communication such as telephone, television, and public forums, will continue to be utilized (N. Smith, personal communication, April 8, 2016).
Another opportunity for improvement is increasing the percentage of Preble County residents who were actually vaccinated during the emergency. Although this small health department was able to vaccinate up to 1,500 patients at each weekly clinic, only 7,000 residents out of a county population of 42,000 (approximately 17%) received immunizations for H1N1 (Couse, 2010). The emergency response team was able to provide vaccinations to anyone who wanted one, and even extended these services to people from other counties who attended the clinic events (S. Cottingim, personal communication, April 8, 2016). However, if the disease had been more virulent with a higher mortality, and more people desired the immunization, a much different scenario may have been observed. As such, continued emergency response preparations for more extensive outbreaks should occur in Preble County.

**Threats.** Part of the success of the PCGHD emergency response to the H1N1 Influenza pandemic was due to the nature of this viral disease (slow spreading with comparatively low mortality) in the rural setting of Preble County (Schanzer, Sevenhuysen, Winchester, & Mersereau, 2013). A potential threat is that public panic might ensue if an outbreak of another disease that surpassed the magnitude of spread and virulence of H1N1 were to occur. As a result, the emergency response team has planned for more extreme events in which the mortality rate is much higher (Balster, 2015; Balster, 2016). Additionally, media support would need further attention during an event such as this, to help provide a directional approach for the citizens who could be extremely concerned (Boin, Hart, Stern, & Sundelius, 2005).

Overall, the emergency response team at PCGHD demonstrated outstanding performance responding to the viral threat of H1N1 influenza in 2009. This department consistently monitored for up-to-date information from the state and federal agencies helping to coordinate their response plans. Communication was enhanced by being smaller in size compared to larger
surrounding counties. Preble County’s response was an overwhelming success for PCGHD and for the field of public health due to prior planning for vaccinating residents, superior communications with local partners, and efficient use of available social media platforms.

**Case Study: Preble County General Health District Table Top Exercise, Ebola, “The Walking Dread”**

The West Central Ohio (WCO) Regional Collaboration and Preparedness Solutions, Inc. (2016) conducted a table top exercise scenario of a patient who had traveled from Sierra Leone to Sidney, Ohio and became symptomatic with flu like symptoms, concerning for Ebola Virus Disease (EVD). The purpose of this table top exercise was to engage all the county emergency management agencies, emergency response teams, health departments, hospitals, emergency medical system, and law enforcement in the Greater Dayton Area Hospital Association (GDAHA) and to exercise the WCO Emerging Infectious Disease Ebola/Special Pathogen Plan (Balster, 2016). This table top exercise gave the county and city emergency management planners the opportunity to discuss their particular procedures and capabilities during a regional response to a virulent infectious disease.

The scenario opened with a family’s flight plan from Monrovia, Liberia, to Brussels, Belgium, on to Chicago, IL, with destination of Dayton International Airport, Dayton, OH (Preparedness Solutions, Inc. [PSI], 2016). The family, consisting of a husband and wife, drove to their home in Ohio from the airport, stopping at several locations on the way to their destination (PSI, 2016). Both husband and wife were monitored through their LHD in Ohio and were considered at low epidemiological risk, according to the ODH and CDC guidelines regulating monitoring and movement (CDC, 2015a). After five days, the woman began to experience a febrile illness with chills, malaise, and fatigue. After consultation with the ODH
and the CDC, the woman was transported via ambulance to the emergency department at the closest EVD assessment hospital (PSI, 2016). The husband remained in his home, as he was not demonstrating any concerning symptoms.

Per the tabletop exercise scenario, after blood specimens were drawn from the female patient at the assessment hospital, EVD was confirmed. Soon thereafter, the husband began to develop fever and was transported via ambulance to the same assessment hospital’s emergency department, where he awaited transport by ambulance to the nearest EVD treatment hospital. This simulated the taxing environment of multiple contagious patients in one hospital. At this point, the local assessment hospital experienced a shortage of supplies that inhibited the hospital’s ability to meet the personal protective equipment (PPE) requirements for safely caring for an infectious patient of this nature (PSI, 2016). The assessment hospital made arrangements to transport via ground transportation, the female patient with confirmed EVD to the only EVD treatment hospital in Ohio, which was four hours away (CDC, 2015b). During this phase of the tabletop exercise, regional epidemiologists began their contact tracing, necessitating resources to help with this task. This demonstrated the need for additional resources to call people who may have been contaminated by this couple during a significant outbreak of infectious disease, such as EVD. Continuing with the scenario, the media gathered in mass around the assessment hospital as well as the patient’s apartment complex, creating additional challenges for healthcare workers, other patients, law enforcement, and the public.

The scenario continued: once the female patient was transported to the EVD treatment center in Ohio, she experienced cardiac arrest and expired. The woman’s family requested a traditional African burial ceremony involving washing the EVD contaminated body (PSI, 2016).
At this point, the exercise concluded allowing each county and organization to discuss their roles and propose appropriate action in the management of this public health crisis.

PCGHD and the Preble County Emergency Management Agency outlined actions that followed their established protocols in their emergency response plan. This included notification of the ODH and the CDC of a potential patient infected with EVD (Balster, 2015). Additionally, news releases through a variety of media services were included in the response plan, explaining the nature of the event and including guidance for public health and safety (Balster, 2015). Given that there are no assessment hospitals in Preble County, the emergency response team planned to follow the directions set by the ODH and CDC by transporting any patient with suspected EVD to the nearest assessment hospital. In this case, during an actual event of EVD, the PCGHD Emergency Response Plan outlines the required notifications to the ODH and CDC, coordination among local emergency response agencies, and arrangement of transport following the guidance of ODH and the CDC (Balster, 2015). In this exercise scenario, several notations and questions were raised concerning the state-wide response plan, frontline hospital preparedness, and transportation of infected patients. To better understand the strengths, weaknesses, opportunities, and threats for Preble County during an infectious disease outbreak, a SWOT analysis is included below to delineate issues that may need to be addressed (Ramezanpour et al., 2015).

**SWOT Analysis**

**Strengths.** By conducting this table top exercise of Ebola Virus Disease, PCGHD Emergency Response team was able to test its plans, work through the levels of notifications, and visualize how it would safely transport the patient to the nearest assessment hospital (Balster, 2015). As the scenario progressed, the emergency response team was able to address media
support to help counter public concern to provide public service announcements, and to begin the daunting process of contact tracing (Balster, 2015). Requesting additional resources, such as manpower to aid with these tasks, were included in the emergency response plan (Balster, 2015). Because Preble County is smaller and more rural than some of the other counties, communications are actually conducted much more easily, facilitating the use of cell phones, texting, and emails among personnel. Additionally, social media modalities are currently utilized in Preble County, making this an excellent forum for updating the residents of this rural community (Balster, 2015).

It is interesting to note that Preble County had an actual concern for Ebola Virus Disease in a young female resident two years ago (N. Smith & S. Cottingim, personal communication, April 8, 2016). This patient had become known to the health department after she traveled from Sierra Leone. She was of low epidemiological risk and was asymptomatic. The PCGHD demonstrated their resourcefulness by utilizing a daily videoconference to monitor the patient for her temperature (N. Smith & S. Cottingim, personal communication, April 8, 2016). This patient remained asymptomatic and never developed any signs or symptoms of EVD. However, the mandatory notifications and monitoring and restriction of movement as delineated by ODH and the CDC were necessary. Interestingly, this patient was a personal acquaintance with several staff members of the PCGHD with whom she had full trust and confidence, which highlights a significant benefit of a small rural area, where familiarity is often in evidence (N. Smith & S. Cottingim, personal communication, April 8, 2016). Additionally, this real-world case demonstrates that effective quarantine procedures could be implemented by the PCGHD Emergency Response team in the event that an actual EVD patient were to present to Preble County.
Weaknesses. During this exercise, it was noted that resources necessary to care for a patient with EVD become depleted very rapidly, including personnel needed to help with administrative tasks, such as contact tracing. This would apply to any organization and is not unique to Preble County. However, since there is no hospital in Preble County, any patient suspected of having EVD would require immediate transport to a frontline or assessment hospital outside the county. This would raise the possibility of incapacitating an ambulance and crew indefinitely due to the potentially hazardous contamination (Balster, 2016; ODH, 2015a) mandates in-state frontline and assessment hospitals be used in the Ebola response, despite closer hospitals in other states. Therefore the patient must remain in the state of Ohio despite a closer hospital in the neighboring state of Indiana. From a patient care perspective, treatment of the patient as soon as possible (regardless of state boundaries) would make more sense; however, state response plans dictate in-state patient transport which could potentially result in delayed diagnosis and treatment (ODH, 2015a).

Although Preble County has one stand-alone emergency department, this facility is not a frontline hospital eligible to accept patients suspected of EVD, and is therefore not included in the Preble County Emergency Response Plan (Balster, 2015). Nonetheless, sick patients who may be at risk for EVD may present to this facility. Therefore, this facility should be prepared regardless of their level of participation in the state’s response plan.

Opportunities. Several opportunities for improvement of the state response plan were elucidated during this table top exercise. First, it was noted during this scenario that the second patient, the husband of the confirmed EVD patient, was again taken to the assessment hospital rather than directly to the treatment hospital (PSI, 2016). From a medical standpoint, it would be reasonable to conclude that a husband of a confirmed positive patient who demonstrates EVD
symptoms should be immediately treated as positive for the viral infection. This requires effective communication between original hospital emergency department and the diagnosing agency. With this reasoning, it would be logical to transport the husband directly to the treatment hospital, avoiding further exposure of the frontline and assessment hospitals, and allowing them to conserve resources. However, contrary to this logical plan of action, the state plan mandates that patients use a frontline and/or assessment hospital first. Such patients are transported to the treatment facility only after lab work confirms the viral infection (CDC, 2015a). As noted by the PCGHD Emergency Response team, following this policy could potentially further expose many healthcare workers and EMS staff. A more logical and safer approach would be to take the spouse of the initial confirmed positive patient directly to the treatment hospital. This would avoid the frontline and/or assessment hospitals, and numerous EMS teams and ambulances, resulting in less exposure to healthcare workers, allowing them to maintain their PPE supplies, and not risking contamination of their hospitals, other patients, emergency departments, and ambulances. Overall it would allow for patient treatment in a much more efficient and expeditious manner.

Another opportunity for improvement concerns the use of a specialized ambulance service, a ‘Special Transport Unit’ (STU), dedicated to transport of extremely infectious patients such as those with EVD (Balster, 2016). There are only two such ambulances in the West Central Ohio region, owned and operated by Montgomery County, with one that was indefinitely under maintenance at the time of the exercise (PSI, 2016). The operational costs of these STUs are considerable given the PPE required, decontamination of the vehicle after transport, maintenance, and training (Cunningham, 2014). However, if more of these types of transport
systems were available to this region of Ohio through resource sharing, it would better ensure the safety of patients and healthcare workers.

**Threats.** If large numbers of infected individuals reported to the local emergency department or to the PCGHD, this would create a scenario where resources are rapidly depleted. There would be a resulting time delay in replenishment by the ODH and other state agencies. As seen in this table top exercise, only 72 hours of supplies are maintained by the assessment and treatment hospitals to provide care for an EVD infected patient (PSI, 2016). PCGHD has addressed this issue in their response plans by requesting additional support and resources from neighboring counties (Balster, 2015).

Also, limitations on the movement of exposed individuals during an outbreak of such magnitude would be almost impossible to control, as there are no legal ramifications or law enforcement to prevent such individuals from traveling (PSI, 2016). Given the small population of Preble County, this could be managed much more easily than in a larger county, as communications to the exposed individuals would be much more personal in nature. Through better personalized communication, individuals are more likely to follow public health directions, thus providing better safety for the community.

As previously stated, due to servicing and decontamination procedures, and continued maintenance required for one of the STUs, the limited ambulance operations in this small county would cease after transport of an extremely infected patient occurred,. The local area emergency department would have a large number of individuals reporting to it, concerned about potential exposure to the infectious agent. This could potentially reduce the capacity to provide emergency care. Likewise, many hospital and EMS employees may not report to duty for fear of contamination, thus creating increasingly back-logged patient waiting rooms and potentially
facilitating the spread of an infectious agent in close quarters (PSI, 2016). These issues could occur regardless of the size or location of the county served, and would require the immediate attention of public health officials in order to educate the public to reduce unnecessary concern.

True leadership in public health must exert its presence in an outbreak of this magnitude, to help reduce public anxiety and guide the public for health and safety. Public health should quickly respond to the media, informing and instructing key leaders in the community and the general public of the issues concerning the EVD illness (Regmi, Gilbert, & Thunhurst, 2015). PCGHD Emergency Response team has planned for media news releases early on during any outbreak, which signifies its attention to this extremely important facet of a public health crisis. Notably, PCGHD’s HC has drafted many public health announcements and has conducted numerous interviews with the media to help address public concern and public safety.

Through precise planning and rehearsal in the form of table top exercises, together with prior experience in dealing with a real-world potential patient, PCGHD has prepared its county as best as possible to respond to an infectious disease outbreak in this region of Ohio (Balster, 2015). Several recommendations have been sent forward to the state to better serve the patients who may be at risk for contracting diseases. These recommendations will allow the health care system to care for patient medical needs more quickly and with less impact to the local health care teams (PSI, 2016). As with any public health concern, preparation is key to effective response. Given the thorough preparation by PCGHD, along with the close connectivity of the community, Preble County is positioned to provide effective, efficient response during any emergency. In this manner, PCGHD remains a genuine asset for this region.
Discussion

By analyzing a rural public health department, one is able to observe the details that make that specific small health department successful. In the case of PCGHD, its small size allows for several advantages, including better communications and easier emergency response planning. On the other hand, its small size and small population served contributes to the decreased state funding that is received when compared to larger organizations. Despite these limited resources, PCGHD does exceedingly well in utilization of the funding and resources provided. This was demonstrated in the two emergency management case presentations.

Recommendations

A minor recommendation for PCGHD would be to incorporate an electronic record system in their daily operations to digitally upload their permits and inspection records. This would create a database that would last longer than paper records, take less physical storage space, and be more easily analyzed for trends in services completed. Additionally, an electronic record database will be more up-to-date, capturing data and workload real-time, which may influence resources obtained from state organizations.

A comparative analysis between PCGHD and a medium-sized and large-sized LHD would provide greater understanding of how a small LHD overcomes its challenges. Looking at both medium and large LHDs may present the observer additional viewpoints for consideration when comparing services at the smaller LHDs. This is a potential area for further analysis that could be added to this observational study. Also, a comparison between two small LHDs may provide evidence that could be used to establish a ‘best practices’ policy. Resource utilization, requests for grant funding, and personnel management are a few examples of comparison between small LHDs that could be used to set best practices.
Conclusion

This observational study revealed a challenging and rewarding experience by teaching the observer about real issues that impact the discipline of public health. Material learned by conducting this observational study will be useful in a variety of disciplines, including environmental health, clinical medicine, home health care, and veterinary services. Additionally, the organizational management learned in conducting this study will be valuable and applicable in any leadership position regardless of type of discipline. It is hopeful that this observational study will serve as a platform for further research into the role of rural public health.
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### Tier 1 Core Public Health Competencies

#### Domain #1: Analytic/Assessment Skills
- Describes factors affecting the health of a community (e.g., equity, income, education, environment)
- Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community
- Uses information technology in accessing, collecting, analyzing, using, maintaining, and disseminating data and information
- Collects valid and reliable quantitative and qualitative data
- Describes assets and resources that can be used for improving the health of a community (e.g., Boys & Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs)
- Contributes to assessments of community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)
- Explains how community health assessments use information about health status, factors influencing health, and assets and resources

#### Domain #2: Policy Development/Program Planning Skills
- Contributes to state/Tribal/community health improvement planning (e.g., providing data to supplement community health assessments, communicating observations from work in the field)
- Describes organizational strategic plan (e.g., includes measurable objectives and targets; relationship to community health improvement plan, workforce development plan, quality improvement plan, and other plans)
- Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community
- Describes implications of policies, programs, and services
- Explains the importance of evaluations for improving policies, programs, and services
- Describes how public health informatics is used in developing, implementing, evaluating, and improving policies, programs, and services (e.g., integrated data systems, electronic reporting, knowledge management systems, geographic information systems)

#### Domain #3: Communication Skills
- Identifies the literacy of populations served (e.g., ability to obtain, interpret, and use health and other information; social media literacy)
- Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)
- Suggests approaches for disseminating public health data and information (e.g., social media, newspapers, newsletters, journals, town hall meetings, libraries, neighborhood gatherings)
- Facilitates communication among individuals, groups, and organizations
- Describes the roles of governmental public health, health care, and other partners in improving the health of a community

#### Domain #4: Cultural Competency Skills
- Describes the concept of diversity as it applies to individuals and populations (e.g., language, culture, values, socioeconomic status, geography, education, race, gender, age, ethnicity, sexual orientation, profession, religious affiliation, mental and physical abilities, historical experiences)
- Describes the ways diversity may influence policies, programs, services, and the health of a community

#### Domain #5: Community Dimensions of Practice Skills
- Describes the programs and services provided by governmental and non-governmental organizations to improve the health of a community
- Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)
- Supports relationships that improve health in a community
- Collaborates with community partners to improve health in a community (e.g., participates in committees, shares data and information, connects people to resources)
- Uses assets and resources (e.g., Boys & Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs) to improve health in a community
## Domain #6: Public Health Sciences Skills

- Describes how public health sciences (e.g., biostatistics, epidemiology, environmental health sciences, health services administration, social and behavioral sciences, and public health informatics) are used in the delivery of the 10 Essential Public Health Services
- Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
- Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)

## Domain #7: Financial Planning and Management Skills

- Describes the structures, functions, and authorizations of governmental public health programs and organizations
- Describes government agencies with authority to impact the health of a community
- Describes public health funding mechanisms (e.g., categorical grants, fees, third-party reimbursement, tobacco taxes)
- Describes how teams help achieve program and organizational goals (e.g., the value of different disciplines, sectors, skills, experiences, and perspectives; scope of work and timeline)

## Domain #8: Leadership and Systems Thinking Skills

- Incorporates ethical standards of practice (e.g., Public Health Code of Ethics) into all interactions with individuals, organizations, and communities
- Describes public health as part of a larger inter-related system of organizations that influence the health of populations at local, national, and global levels
- Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community
- Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)
- Identifies internal and external facilitators and barriers that may affect the delivery of the 10 Essential Public Health Services (e.g., using root cause analysis and other quality improvement methods and tools, problem solving)

## Concentration Specific Competencies

### Emergency Preparedness:

- Demonstrate the understanding of model leadership in emergency conditions
- Communicate and manage information related to an emergency
- Employ ethical principles in the practice of public health emergency preparedness
- Demonstrate an understanding of the protection of worker health and safety