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OFFICE OF THE
AUDITOR GENERAL

Frank J. Mautino, Auditor General

REPORT DIGEST

**PERFORMANCE
AUDIT**

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Number 1186

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EXECUTIVE SUMMARY

Legionnaires' Disease at the Quincy Veterans' Home

On February 15, 2018, Senate Resolution Number 1186 was adopted and directed the Office of the Auditor General to conduct a performance audit of the Illinois Department of Veterans' Affairs' management of the Legionnaires' disease outbreaks at the Quincy Veterans' Home (see Appendix A). The audit found:

- In addition to the 57 legionella cases at the Quincy Veterans' Home in 2015, there were numerous residents and staff sick during the first legionella outbreak; in total, 220 residents and staff were sick in August and September 2015.
- Although there was confirmation of a second case of Legionnaires' disease at the Home on August 21, 2015, there was limited notification or specific procedures provided to the nursing staff necessary to protect residents or employees until guidelines for water restrictions were provided on August 27, 2015.
- Auditors determined that the Quincy Veterans' Home did not have documentation to support increased monitoring of residents until after the residents exhibited the onset of the Legionnaires' disease symptoms. Although Home officials stated that skilled care residents were monitored every four hours and independent care residents were monitored twice daily beginning on August 22, 2015, there was no documentation to support that a directive was provided to the nursing staff or whether it was followed.
- The Illinois Department of Public Health (IDPH) did not go on-site at Quincy Veterans' Home until midday on Monday, August 24th. That was nearly three days (approximately 67 hours) after the 2nd case was confirmed late in the afternoon on August 21st. The site visit focused on one building where the two confirmed cases were located.
- On Wednesday, August 26th, five days after the identification of the initial outbreak, IDPH officials met with Quincy Veterans' Home officials and found that the "central hot water tank may be associated with [the] outbreak." It was learned that hot water tank number 2 was out of service since the beginning of July 2015 due to a valve issue and was unheated until it was cycled back into service on August 6, 2015. Following that discovery, IDPH began recommending water restrictions and remediation of the potable water system.
- During the 2015 outbreak, auditors determined that there was limited communication between IDPH and the Quincy Veterans' Home staff. IDPH officials often did not know the seriousness of the problem at the Quincy Veterans' Home.
- As of June 30, 2018, the State has expended \$9,625,718 for legionella remediation at the Quincy Veterans' Home since the initial outbreak in August 2015.
- In December 2015, the Centers for Disease Control and Prevention (CDC) recommended point-of-use filter installation on **all** fixtures fed from the potable hot-water system. Filters were not installed on **all** fixtures other than the showers until after the February 2018 outbreak, in April 2018.
- The response by IDVA to the February 2018 outbreak was more timely and informative than after the other three outbreaks in 2015, 2016, and 2017.

AUDIT SUMMARY AND RESULTS

Legionnaires’ disease is a serious disease especially for the residents at a nursing facility. According to the Centers for Disease Control and Prevention (CDC), 1 in 4 that get the disease in a healthcare facility will die.

Legionnaires’ disease is a serious disease especially for the residents at a nursing facility. According to the Centers for Disease Control and Prevention (CDC), 1 in 4 that get the disease in a healthcare facility will die. The disease also is more serious in populations 50 years old or greater. There have been numerous cases of legionellosis at the Illinois Veterans’ Home at Quincy since July 2015. According to Illinois Department of Veterans’ Affairs’ (IDVA) officials, there were no known cases of legionellosis at the Quincy Veterans’ Home prior to the 2015 outbreak. Since the 2015 outbreak, 66 residents and 8 employees/volunteers have tested positive for legionellosis and 13 related resident deaths occurred.

In addition to the legionella cases at the Quincy Veterans’ Home in 2015, there were numerous residents and staff sick during the first legionella outbreak. According to documentation provided by IDVA, in total, 220 residents and staff, including those with legionellosis, were sick in August and September 2015. Of those who were sick, there were 57 residents and staff who tested positive for legionellosis and 101 who tested negative. The majority of the illnesses, 191 of 220 (87%), were reported between August 21, 2015, and September 10, 2015.

Outbreak Response

Until August 27, 2015, there was limited notification or specific procedures provided to the nursing staff at the Quincy Veterans’ Home that were necessary to protect residents or employees. This was six days following confirmation of the 2nd case.

Due to the seriousness of the disease, especially with the at-risk population at the Quincy Veterans’ Home, auditors identified the following issues with the initial response in 2015 by the Illinois Department of Public Health (IDPH) and IDVA once the 2nd case was confirmed on August 21, 2015:

- Until August 27, 2015, there was limited notification or specific procedures provided to the nursing staff at the Quincy Veterans’ Home that were necessary to protect residents or employees. This was six days following confirmation of the 2nd case;
- Auditors determined that the Quincy Veterans’ Home did not have documentation to support increased monitoring of residents until after the residents exhibited the onset of the Legionnaires’ disease symptoms. Although Quincy Veterans’ Home officials stated that skilled care residents were monitored every four hours and independent care residents were monitored twice daily beginning on August 22, 2015, there was no documentation to support that a directive was provided to the nursing staff or whether it was followed. Additionally, auditors reviewed the medical records for the 45 residents who had disease onset after August 21, and found that none received increased monitoring prior to the onset of symptoms;
- IDPH did not go on-site at Quincy Veterans’ Home until midday on Monday, August 24. That was nearly 3 days (approximately 67 hours) after the 2nd case was confirmed late in the afternoon on August 21st. The site visit focused on one building where the two confirmed cases were located;
- On Wednesday, August 26, the site visit continued again around midday. This was five days after the identification of the initial outbreak. Based

Although Quincy Veterans’ Home officials stated that skilled care residents were monitored every four hours and independent care residents were monitored twice daily beginning on August 22, 2015, there was no documentation to support that a directive was provided to the nursing staff or whether it was followed.

In December 2015, the CDC recommended point-of-use filter installation on all fixtures fed from the potable hot-water system. Filters were not installed on all fixtures other than the showers until after the February 2018 outbreak, in April 2018.

on our review of documents and emails, IDPH met with Quincy Veterans’ Home officials and found that the “central hot water tank may be associated with [the] outbreak.” It was learned that hot water tank number 2 was out of service and sat unheated since the beginning of July 2015 due to a valve issue. The tank was heated and was cycled back into service on August 6, 2015. Following that discovery, IDPH began recommending water restrictions and remediation of the potable water system;

- Based on our review of communications between IDPH and the Quincy Veterans’ Home, auditors determined that there was limited communication between IDPH management and the Quincy Veterans’ Home staff. As identified in our timeline in Chapter 2, IDPH officials often did not know the seriousness of the problem at the Quincy Veterans’ Home; and
- In December 2015, the CDC recommended point-of-use filter installation on **all** fixtures fed from the potable hot-water system. Filters were not installed on **all** fixtures other than the showers until after the February 2018 outbreak, in April 2018.

The response by IDVA to the February 2018 outbreak was more timely and informative than after the other three outbreaks in 2015, 2016, and 2017.

Timeline of Initial Response

The following are some highlighted key events that occurred in relation to the initial response after the notification of the outbreak in the late afternoon of August 21, 2015:

- **August 21, 2015** -guidance is provided to the Quincy Veterans’ Home from IDPH to have a heightened awareness of respiratory deterioration, or fever/cough at this time; turn off the outdoor fountains; keep the windows in the Elmore building closed (the initial two residents both lived in the Elmore building); and use bathing facilities other than the areas that were used by the two residents who tested positive.
- **August 22, 2015** -the Adams County Health Department visits the Home to take pictures of the cooling tower;
- **August 23, 2015** -the Adams County Health Department interviews residents who became ill over the weekend;
- **August 24, 2015** -IDPH arrives on-site at midday to begin its initial site visit;
- **August 26, 2015** -IDPH arrives on-site around midday for a second day and it is determined there was an issue with the campus-wide potable water system;
- **August 27, 2015** -The Quincy Veterans’ Home provides nursing staff with guidelines for water restrictions;
- **August 28, 2015** -Contractor begins cleaning of the Quincy Veterans’ Home cooling tower;
- **September 1, 2015** -The CDC arrives for site visit;

- **September 9, 2015** -The IDVA contractor begins disinfecting the Quincy Veterans’ Home potable water system; and
- **September 18, 2015** -The Quincy Veterans’ Home begins installation of point-of-use water filters on showers and tubs.

A more detailed timeline of events can be found in Chapter 2 of this report or can be viewed at: <https://www.auditor.illinois.gov/>.

Infrastructure Improvements

According to CDC site visit reports, the water system at the Quincy Veterans’ Home was very complex. The infrastructure was old and has had several major water utility upgrades and construction projects since it was established in 1886. The reports also identified several reasons/issues associated with legionella growth present at the Quincy Veterans’ Home.

IDPH worked in conjunction with the CDC and the Adams County Health Department to respond to the outbreak. On September 29, 2015, the Quincy Veterans’ Home requested that the Capital Development Board procure an emergency contract to implement infrastructure changes to prevent the further spread of Legionnaires’ disease. As a result, in 2016, two major infrastructure projects were completed. First, the hot water system was decentralized allowing for appropriate hot water temperatures needed to control legionella. Second, the on-site chemical treatment facility was completed to ensure appropriate disinfectant levels were maintained at the Quincy Veterans’ Home. The water treatment facility was completed in June 2016.

Legionella Outbreak Costs

As of June 30, 2018, the State has expended \$9,625,718 for legionella remediation at the Quincy Veterans’ Home since the initial outbreak in August 2015.

The remediation efforts related to the outbreak at the Quincy Veterans’ Home were paid for through emergency purchase funds utilized by the Illinois Environmental Protection Agency, the Capital Development Board, and IDVA. As of June 30, 2018, the State has expended \$9,625,718 for legionella remediation at the Quincy Veterans’ Home since the initial outbreak in August 2015.

The largest amounts were paid to the plumbing contractor who completed the construction efforts for the infrastructure improvements (\$5.70 million) and to the water testing vendor (\$1.35 million). In addition to the payments for infrastructure improvements, the Sycamore Nursing Home in Quincy was purchased on June 5, 2018, for \$630,000. This vacant nursing home, now named Lester Hammond Hall, was purchased to renovate for additional skilled care as part of the Quincy Veterans’ Home.

Monitoring and Training at the Quincy Veterans’ Home

The main improvements at the Quincy Veterans’ Home consisted of installing decentralized hot water heaters in each building and the installation of a new water treatment facility.

The main improvements at the Quincy Veterans’ Home consisted of installing decentralized hot water heaters in each building and the installation of a new water treatment facility. Therefore, auditors determined that monitoring efforts mainly consisted of some form of water monitoring and testing.

Water monitoring and testing after the initial outbreak was conducted by Bainter Environmental and by Phigenics, LLC. Bainter is a licensed water

According to documentation provided by IDVA, there were no legionella policies in place and there had been no training on legionella prior to the 2015 outbreak at the Quincy Veterans’ Home.

operator and was also contracted in September 2015 to be in charge of all water operations. This eventually included performing the daily operational duties of the new water treatment plant once it was completed in June 2016. Bi-weekly water testing for legionella began in October 2015, by Phigenics.

According to documentation provided by IDVA, there were no legionella policies in place and there had been no training on legionella prior to the 2015 outbreak at the Quincy Veterans’ Home. According to IDVA, there was no State or federal requirement to test for legionella. IDVA stated the first Legionnaires’ disease training occurred on August 26, 2015, which was five days after the identification of the outbreak. Prior to training, staff were provided with little information on the disease, other than information discussing handwashing etiquette.

When asked about operating protocols and training provided to the Quincy Veterans’ Home staff following the 2015 outbreak, auditors were provided with a Legionella Policy that was developed in August 2016. The Quincy Veterans’ Home required annual training for its staff in 2016, 2017, and 2018.

Residential Care Reviews

The Quincy Veterans’ Home has undergone several reviews since the initial outbreak in August 2015. IDPH, the U.S. Department of Veterans Affairs, and the CDC have released multiple reports, surveys, and reviews related to the Quincy Veterans’ Home.

The CDC was on-site at the Quincy Veterans’ Home in 2015, 2016, 2017, and 2018 and released four reports that contained recommendations to remediate the legionella at the Quincy Veterans’ Home. It did not appear from the reports that specific resident care reviews were conducted.

Resident care reviews by IDPH were conducted in December 2015 and October 2017. In 2015, there were concerns noted that filters were plugged up causing low water pressure. Shower frequency was also a focus area for surveyors. In 2017, no issues were identified related to legionella.

There were reviews conducted by the U.S. Department of Veterans Affairs in October 2015, 2016, and 2017. Only in 2015 were any issues identified, and none of the areas were directly related to the water system or legionella.

BACKGROUND

Senate Resolution Number 1186 was adopted on February 15, 2018, and directed the Office of the Auditor General to conduct a performance audit of the Illinois Department of Veterans’ Affairs’ management of the Legionnaires’ disease outbreaks at the Quincy Veterans’ Home. The Resolution contained six determinations directing auditors to review:

- 1) The responses of IDVA to the outbreaks of Legionnaires’ disease in 2015, 2016, and 2017, including the recommendations made in the 2015 study by the Centers for Disease Control and the Department’s actions to address those recommendations.

- 2) The type, cost, and timing of any infrastructure or other building improvements intended to contain the further spread of Legionnaires’ disease or prevent its reoccurrence.
- 3) The nature of changes made by the Department in operating protocols and staff training thereon, intended to contain the further spread of Legionnaires’ disease or prevent its reoccurrence.
- 4) The nature and extent of monitoring conducted by the Department to determine whether the improvements and protocols put in place are effective to ensure the safety of residents and staff at the Quincy Veterans’ Home.
- 5) The amount of State moneys received and the amount of State moneys expended by the Department or any other State agency during State fiscal years 2015, 2016, 2017, and 2018, for infrastructure improvement, monitoring, and other measures taken to address the Legionnaires’ disease outbreaks.
- 6) To the extent information is available, whether the Quincy Veterans’ Home has been the subject of any reviews since 2015 to determine its compliance with applicable laws and regulations with regard to the care of its residents and, if so, the results of those reviews.

LEGIONNAIRES’ DISEASE AT THE QUINCY VETERANS’ HOME

The Veterans’ Home in Quincy, Illinois was established in 1886 and is currently the oldest licensed veterans’ home in the State of Illinois and is situated on 210 acres with independent utilities, including water, maintained on-site by the Home. At its peak in the early 1900s, over 1,600 people were housed at the facility. Today the facility houses approximately 400 individuals.

Many of the optimal conditions for legionella growth were found at the Quincy Veterans’ Home. These include the presence of biofilm, scale, and sediment. The CDC also determined that the Quincy Veterans’ Home had “sub-optimal” hot water holding temperature throughout the entire campus, inadequate disinfectant levels sustained in the facility’s potable water system, and dead-end lines and opportunities for water stagnation and irregular flow.

According to the CDC, legionella in man-made water systems can amplify and be transmitted by aerosolized water droplets from whirlpool tubs/spas, showerheads, decorative fountains, cooling towers, and “rarely” via aspiration of water.

Legionnaires’ Disease

According to the CDC, Legionnaires’ disease is a type of pneumonia caused by bacteria called legionella that live in water. The legionella bacteria can make individuals sick when contaminated water vapor is inhaled. Legionnaires’ disease cannot be contracted through drinking contaminated water or by person-to-person contact. One issue that may have led to the number of residents sick at the Quincy Veterans’ Home was the time it takes for the onset of symptoms. According to the CDC, symptom onset occurs

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According to the CDC, Legionnaires’ disease is a type of pneumonia caused by bacteria called legionella that live in water. The legionella bacteria can make individuals sick when contaminated water vapor is inhaled. Legionnaires’ disease cannot be contracted through drinking contaminated water or by person-to-person contact.

anywhere from 2 to 10 days after exposure. The CDC also notes that in rare cases, onset can be as long as 19 days.

System Disruption at Quincy Veterans’ Home in 2015

The CDC reported a system disruption occurred during July 2015. The report noted that one of the two boilers was taken offline for approximately 30 days. The water was not drained and was later heated to 120 degrees Fahrenheit before being released through the closed hot water distribution system on August 6, 2015. Given that 120 degrees Fahrenheit is not hot enough to kill legionella bacteria (140 degrees Fahrenheit minimum is needed to kill legionella in most environments), and the water was released back into the hot water loop, which was the source of **all hot water to all residential buildings**, this appears to be the likely cause of the initial outbreak. Additionally, with the long incubation period for the onset of symptoms (up to 19 days), this is in line with the timeframe for the peak of the outbreak.

Legionella Preparedness

According to IDVA officials, there had been no known cases of legionellosis at the Quincy Veterans’ Home prior to the August 2015 outbreak. As a result, there was no routine water testing for legionella. Additionally, there was no water management plan or specific legionella plan in place prior to the 2015 outbreak. Finally, the Quincy Veterans’ Home engineering staff had no experience or training with legionella prevention or remediation.

Cases of Legionnaires’ Disease at the Quincy Veterans’ Home

There have been numerous separate outbreaks of legionellosis at the Quincy Veterans’ Home since July 2015. Since the 2015 outbreak, **66 residents and 8 employees/volunteers have tested positive for legionellosis and 13 related resident deaths occurred**. The time periods for onset of the disease were as follows:

1. From July 28, 2015 to September 21, 2015, **51 residents and 6 employees or volunteers** tested positive for the disease during the first outbreak. There were **12 resident deaths** associated with the 2015 outbreak.
2. From March 1, 2016 to April 1, 2016, **2 volunteers** tested positive for the disease. No deaths occurred.
3. From July 14, 2016 to December 10, 2016, **6 residents** tested positive. No deaths occurred.
4. From May 22, 2017 to November 19, 2017, **5 residents** tested positive. There was **one resident death** associated with the 2017 outbreak.
5. From February 8, 2018 to February 15, 2018, **4 residents** tested positive. No deaths resulted from the February 2018 outbreak.

Since the 2015 outbreak, 66 residents and 8 employees/volunteers have tested positive for legionellosis and 13 related resident deaths occurred.

According to IDVA officials, as of December 2018, there have been no cases of legionellosis after the four confirmed cases in February 2018. This was likely due to the installation of point-of-use water filters on every sink,

faucet, drinking fountain, and ice machine throughout the campus following the February 2018 outbreak.

OUTBREAK COSTS

As of June 30, 2018 (the end of fiscal year 2018), the Capital Development Board and the IEPA expended just over \$6.6 million since the outbreak began in August 2015. IDVA costs were significantly lower at \$3.02 million.

As shown in Digest Exhibit 1, the State so far has expended \$9,625,718 for legionella remediation at the Quincy Veterans’ Home since August 2015. This includes expenditures for various infrastructure projects, consulting, water testing, and other general expenses to help stop the spread of the disease such as bottled water and cleaning supplies. A large portion of these expenses were paid to two contractors for design and construction using Illinois Environmental Protection Agency (IEPA) funds after Emergency Purchase Affidavits were filed by the Capital Development Board.

**Digest Exhibit 1
COSTS FOR LEGIONELLA REMEDIATION AT THE
QUINCY VETERANS’ HOME
For Fiscal Years 2016 through 2018**

	FY16	FY17	FY18	Totals
CDB/IEPA	\$2,699,326.34	\$3,693,604.90	\$209,930.30	\$6,602,861.54
IDVA	\$1,181,823.91	\$639,878.14	\$1,201,154.03	\$3,022,856.08
Totals¹	\$3,881,150.25	\$4,333,483.04	\$1,411,084.33	\$9,625,717.62

Note: ¹ Does not include purchase of Sycamore Nursing Home, the federal reimbursement received by the Capital Development Board, or increased water costs at the Quincy Veterans’ Home due to its flushing efforts.

Source: Information provided by CDB and IDVA.

The remediation efforts related to the outbreak at the Quincy Veterans’ Home were paid for through emergency purchase funds utilized by the Capital Development Board, IEPA, and IDVA. As of June 30, 2018 (the end of fiscal year 2018), the Capital Development Board and the IEPA expended just over \$6.6 million since the outbreak began in August 2015. IDVA costs were significantly lower at \$3.02 million.

AUDIT RECOMMENDATIONS

The audit report contains four recommendations. Two of the recommendations were directed to both the Department of Veterans’ Affairs and the Department of Public Health. One recommendation was directed specifically to the Department of Public Health and one to the Department of Veterans’ Affairs. Both Veterans’ Affairs and Public Health generally agreed with the recommendations. The complete responses from the agencies are included in this report as Appendix C.

The audit recommends the following:

1. The Illinois Department of Veterans’ Affairs and the Illinois Department of Public Health should ensure that once a legionella outbreak is confirmed at a State Veterans’ Home, nursing staff and caregivers are given the necessary instructions and guidelines in a timely manner to

- limit exposure to aerosolized water in order to protect both the staff and residents from contracting Legionnaires’ disease.
2. The Illinois Department of Veterans’ Affairs should develop resident monitoring protocols for use during suspected legionella outbreaks at State Veterans’ homes to ensure timely diagnosis and treatment of Legionnaires’ disease.
 3. The Illinois Department of Public Health should:
 - revisit its policies and determine what response timeframe is adequate to conduct on-site monitoring visits in response to a confirmed disease outbreak such as Legionnaires’ disease; and
 - increase communication with the facility’s staff during future outbreaks to ensure that IDPH is aware of the severity of the outbreak.
 4. The Illinois Department of Public Health and the Illinois Department of Veterans’ Affairs should ensure the State facilities, such as the Quincy Veterans’ Home, implement all recommendations from the Centers for Disease Control following confirmed outbreaks such as Legionnaires’ disease.

This performance audit was conducted by the staff of the Office of the Auditor General.

SIGNED ORIGINAL ON FILE

Joe Butcher
Division Assistant Director

This report is transmitted in accordance with Section 3-14 of the Illinois State Auditing Act.

SIGNED ORIGINAL ON FILE

FRANK J. MAUTINO
Auditor General

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