

## Rodent Control and Public Health: An Assessment of U.S. Local Rodent Control Programs



### Introduction

From the 1900 San Francisco bubonic plague epidemic to the 2012 Yosemite National Park hantavirus infection outbreak, rodents have always been a prominent feature of the environment and can compromise the public's health. In addition to potentially carrying parasites and pathogens, rodents have been destroying infrastructure, infesting houses and businesses, and damaging property for centuries.

The three main rodent pests in the United States are the house mouse, Norway rat, and roof rat. Rodents transmit a large number of diseases, and in many places rodents live in close contact with humans. Rodents can directly transmit disease through feces, urine, or saliva or indirectly transmit diseases through ticks, mites, or fleas.<sup>1</sup> The United States has had cases of rodent-borne diseases such as plague, hantavirus, leptospirosis, rat bite fever, and murine typhus fever. A recent study found rats infected with bacterial pathogens known to cause gastroenteritis and infectious agents associated with febrile illnesses such as leptospirosis.<sup>2</sup> The study also identified known and novel viruses important to humans; two new species appeared to be similar to the hepatitis C virus. Rodents have also been linked to health problems associated with asthma and indoor allergic reactions.<sup>3</sup>

Rodent control programs in the United States have conducted rodent control activities for over 100 years. Throughout history, such activities have significantly changed; for example, pest control efforts have moved away from traditional poisoning and trapping toward an Integrated Pest Management (IPM) approach. IPM manages pests and disease vectors through pest prevention, pest reduction, and elimination of conditions that lead to infestations through safe and effective interventions.<sup>4</sup>

In 2015, the National Association of County and City Health Officials (NACCHO) and the Centers for Disease Control and Prevention (CDC) conducted a study to understand the current capacity of local rodent control programs across the United States. They assessed nine local rodent control programs to identify best practices, challenges, and technical assistance needs. This document presents an overview of the findings. In addition, case studies summarizing each agency's



Photo courtesy of Multnomah County Department of Health

rodent control program are available at <http://naccho.org/topics/environmental/vector-borne-disease-control/>.

### Methods

NACCHO and CDC invited nine organizations from diverse cities to participate in an assessment of their rodent control programs:

- Austin/Travis County (TX) Health and Human Services Department;
- District of Columbia Department of Health;
- Los Angeles County Department of Public Health;
- Multnomah County (OR) Department of Public Health;
- New Orleans Mosquito, Termite, & Rodent Control Board;
- New York City Department of Health and Mental Hygiene;
- Philadelphia Department of Public Health;
- San Francisco Department of Public Health; and
- Shelby County (TN) Health Department.

NACCHO conducted in-depth telephone interviews with each participating program. Key questions and priority areas for the program assessment questionnaire were developed through research and consultation with subject matter experts in rodent control. The questionnaire contained sections that corresponded to the 10 Essential Public Health Services.<sup>5</sup>



Photo courtesy of Multnomah County Department of Health

## Results

A majority of the surveyed programs are located in a comprehensive vector program in the environmental health division of the LHD. However, in New Orleans, the Mosquito, Termite, and Rodent Control Board within the City Department of Homeland Security assumed the operations of the program from the health department because the duties aligned with those of the board. A majority of the programs are funded by local funds. Only two programs, Los Angeles County and Shelby County, are funded by service fees. In Shelby County, the program is fully funded through a state-legislated vector control fee. Overall, funding for a majority of the programs has either decreased or remained the same within the past five years. The five programs that noted a decrease in funds significantly reduced or adjusted staffing and activities. For example, Los Angeles County's program, which had previously addressed rodent complaints from owner-occupied properties for free, now has a pay-for-service fee.

All programs use IPM in rodent control efforts and are mainly complaint-based; five programs conduct a variety of proactive activities. Generally, the number of complaints reported within the past year ranged from 10 to 2,000 per month, depending on the jurisdiction. All programs use a hotline for the public to report

rodent problems and record and track public complaints. Some programs are more proactive than others with activities ranging from selective baiting of manholes to conducting hundreds of thousands of inspections. In New York City, the Rodent Reservoir Analysis project identified and studied "rat reservoirs" in local neighborhoods. Inspectors set bait for the rats, closed up burrows, and worked with the community on best practices. Philadelphia's program staff includes mechanics who perform rat-proofing services each year, such as repairing plumbing and filling holes.

None of the programs tracks rodent-borne illnesses or rodent-related injuries/bites, but the programs do rely on notifications from their agencies' epidemiology divisions. No human cases of rodent-borne diseases were confirmed in the past year, although some programs reported rodent-related injuries/bites. Not all programs have the capacity to capture rodents, test for pathogens, or comb for ectoparasites. Previous activities in Los Angeles County resulted in finding rodents that carried human infectious agents, specifically two strains of human hepatitis E virus and *Bartonella* species bacteria.

Public education is a priority for every program surveyed. All programs inform the public about the importance of rodent control; for example, New Orleans offers a Pest Control Academy, and San Francisco holds educational meetings with the San Francisco Professional Gardeners Association. Programs disseminate rodent-related information through pamphlets and online resources. In Washington, DC, the program aims to educate the public and change behavior to mitigate the determinants of rodent activity. The program works closely with the DC Department of Public Works to provide live Web chats with the public or “Rat Summits” to discuss rodent control practices. Austin’s rodent control program successfully educates and reaches out to many different populations in the area, such as the Spanish-speaking community, through translated fact sheets and other resources.

Additionally, most programs collaborate extensively with other city departments or other organizations. In some cities, several departments may share the various responsibilities for rodent control, including sanitation, housing, and parks and recreation. Sharing responsibility presents a unique challenge in Washington, DC, where nearly 42% of the land is federal land. The program has worked with the Department of the Interior to coordinate a federal-state approach to rodent control. In New York City, the program leads the Mayor’s Rodent Task Force, which convenes weekly and consists of more than 20 city departments. Local rodent control programs have also partnered with organizations such as universities. For example, in Multnomah County, the program partnered with local universities to conduct research. A recent survey found that local rodents tested positive for human diseases such as hepatitis E, leptospirosis, and toxoplasmosis.

Code enforcement is also an important component to rodent control; however, not all programs assessed have enforcement power. For example, in Washington, DC, the program has strict commercial enforcement but limited residential enforcement. Most programs review policies and regulations regarding rodent-control on an as needed or regular basis. Every program makes an effort to educate the public and stakeholders about policy changes relating to rodent control. A legal framework is necessary to support effective rodent control measures and safeguard the health and safety of rodent control practitioners.

To ensure a competent workforce, all programs have processes to ensure that employees are properly certified and attend ongoing education and training courses. However, all programs expressed a desire for more staff training opportunities that include lectures, field work, and laboratory work. New York City has developed its own Rodent Academy, which provides training and courses on IPM; biology, behavior, and habitat of rodents; contributing factors to infestation; effective ways of evaluating site-specific responses and strategies; and effective communication strategies. Since 2005, the three-day academy has trained over 2,000 individuals from all over the United States.



*Photo courtesy of District of Columbia Department of Health*

## [RESEARCH BRIEF]

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### Conclusion

Local rodent control programs face many challenges, including a lack of funding and resources. Various aspects of the behavior and biology of rodents, such as the reproductive potential, trap avoidance, and feeding behavior complicate rodent control; therefore, rodent control is especially difficult when a program is solely complaint-based. While many rodent control programs have seen positive outcomes as a result of their work, fluctuations in funding have made it difficult to sustain these positive outcomes in the long term. Additionally, property and business owners may lack understanding of rodent control. Proactive public education by local rodent control programs can prevent a misinformed public. The lack of training opportunities is a continual challenge for many of the local rodent control programs assessed. Program staff must have up-to-date knowledge of rodent control, including rodent biology and behavior, IPM practices, and response strategies. The subject also lacks scientific literature and research; for example, respondents noted more research could be conducted on the profiling of different rodent ecosystems (e.g., descriptions of environments, behaviors exhibited, and genomic analysis) and on the surveillance of rodents arriving via ships or trains. National-level groups could host a rodent control research symposium to encourage and promote collaborations and research among rodent control practitioners and to raise awareness of the importance of rodent control. With enough staff, funding, public education, resources, and technology, rodent control programs could be even more successful. Framing rodent control as a public health issue, and collaboration among public health professionals and their communities, will help create long-term and more successful solutions to control rodent populations and keep rodent-borne diseases at bay.

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# Rodent Control Program Assessment: San Francisco Department of Public Health

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## Introduction

In the early 1900s, San Francisco's Chinatown was the center of the first bubonic plague epidemic in the continental United States. Authorities worked to build a case to prove there was a major public health problem, and funds were provided to develop a comprehensive rodent control program for the city. By 1908, after two million rats had been killed and 190 people had died in two outbreaks, the plague was finally eradicated from San Francisco.

Currently, San Francisco has no comprehensive vector control program. Rodent control is conducted by food inspectors in their assigned district and by Code Enforcement Technicians within the Healthy Housing Program and Vector Control Program, in the Environmental Health Branch, San Francisco Department of Public Health (SFPDH). Overall, the Healthy Housing Program and Vector Control Program has three rodent control components: (1) addressing rodent issues identified during routine Healthy Housing Program inspections; (2) addressing rodent issues identified in response to complaints; and (3) routinely baiting city manholes for sewer rats.

Because SFPDH does not have a comprehensive vector control program, all vector issues are addressed as complaints under the public health nuisance ordinance. SFPDH, which has conducted rodent control activities and surveillance in different capacities since the early 1900s, was well staffed until 1990, when funding significantly decreased. Currently, the Healthy Housing Program consists of 11 staff, who inspect over 16,000 multi-unit apartments and incorporate rodent control into their duties. No staff are dedicated solely to conducting rodent control activities. Rodent control activities are funded through the general fund, and funding has remained the same for the past five years. The Vector Control and Health Housing Inspection Program Fee, charged to multi-unit apartments and hotel owners, covers the cost of regularly occurring inspections, initial complaint-based inspections, and the first reinspection.

## Rodent Control Activities

As part of the program's rodent control activities, the program follows integrated pest management (IPM) principles to monitor and respond to rodent activities efficiently and safely. SFPDH employs the service of PESTEC, an IPM company, to bait manholes in San Francisco. PESTEC uses traps and rodenticides in its rodent control activities. PESTEC rodent control is primarily complaint-driven, with a comprehensive manhole treatment program with a budget of \$200,000 per



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year, half of which is exclusively for Chinatown. In 2014, the program responded to approximately 23 complaints per month depending on the season. The complaints were recorded into a database upon receipt. The most common rodent related issues reported included infestation of housing and food facilities.

In San Francisco, the most common rodents are roof rats, Norway rats, and house mice. The program does not track rodent-borne diseases and rodent-related bites/injuries but relies on experts in the Bureau of Disease Control to notify the program. The program had no rodent-borne diseases and no bites/injuries in the past year.

## Public Education and Partnerships

SFPDH staff engage with the local community on rodent control through meetings with residents and special interest groups; for example, staff conduct educational meetings with the San Francisco Professional Gardeners Association. In the past, the program provided comprehensive all-day training on vector and rodent control for service providers, hotel managers and owners, apartment managers and owners, and other interested groups. While no rodent-specific communication plan exists, SFPDH disseminates rodent-related information through pamphlets, the SFPDH website, and online resources. Rodent control program data and health information can be publicly accessed through the database with a query request. SFPDH also works with

With adequate funding and staffing, the program would look to establish a training program for staff that included lectures, field work, and lab work.



local city departments and agencies, such as the San Francisco Public Utilities Commission, San Francisco Recreation and Parks Department, San Francisco Department of the Environment, and San Francisco Department of Building Inspection.

## Policies and Regulations

The publication *Director's Rules and Regulations for Prevention and Control of Rodents and other Vectors, and to Promote Housing Habitability* provides guidance to all relative stakeholders regarding best practices for vector control and prevention. All laws and regulations related to rodent control are reviewed as needed. The program supports public and private pest management programs and enforces vector control laws when needed. The program makes an effort to educate and inform the public about any changes in laws or regulations, specifically during routine inspections and when responding to complaints or upon request. The program also assesses the ability of relevant community members to comply with the laws and regulations.

## Rodent Control Program Workforce

Processes exist to ensure employees have proper certifications; for example, employees are California Department of Public Health Certified Vector Control Technicians and attend ongoing education and training courses. Currently, there is no in-house program to train rodent control staff. Technicians must self-study for vector control certifications and attend seminars when available. With adequate funding and staffing, the program would look to establish a training program for staff that included lectures, field work, and lab work.

## Conclusion

The most significant challenges for the Healthy Housing Program and Vector Control Program are lack of funding for rodent control, lack of adequate staffing to conduct IPM inspections, lack of regulations that address construction sites, and pre-baiting issues to prevent rodent migration into communities. Despite the challenges, the Healthy Housing Program and Vector Control Program has been successful in identifying rodent infestation during routine inspections, responding to complaints promptly, using a private pest control company to bait sewers, and targeting communities with the greatest rodent populations.

In the future, SFDPH hopes to gain funding and support to establish a comprehensive vector control program, with concentration on rodents and mosquitos.

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# Rodent Control Program Assessment: New York City Department of Health and Mental Hygiene

July 2015

## Introduction

Norway rats first came to New York City in the 18th century, and as the city's population grew, so did the rodent population. The city harbors one of the largest rat populations in the United States. In New York, rodent control is conducted by the Office of Pest Control of the Bureau of Veterinary and Pest Control Services within the Division of Environmental Health at the New York City Department of Health and Mental Hygiene (NYC DOHMH).

NYC DOHMH has conducted rodent control activities for over 100 years. Rodent control activities are funded by local support. The funding for rodent control has decreased within the past five years, resulting in staffing cuts to the program. However, as a result of a successful pilot program, the Rodent Reservoir Analysis (described below), the city has proposed to increase funding by \$2.9 million, supporting 50 additional staff, including sanitation staff, exterminators, and a rodent biologist. The total staffing of the program is 170.

## Rodent Control Activities

As part of the program's rodent control activities, the Office of Pest Control is both a proactive and complaint-based program. Program inspectors perform "rodent indexing," which is block-by-block inspection of properties in a targeted area to look for active rodent signs, provide education, and enforce rat control measures. The Office of Pest Control references historical data and trends when performing rodent control activities, such as rodent indexing, in New York.

The program conducts about 100,000 initial inspections. The program receives rodent complaints via the city's 311 line, and complaints are scheduled for inspection and analysis. The program received approximately 2,000 complaints per month in 2014, which varied by season. Rodent complaints represented about 40% of the complaints directed to NYC DOHMH. The program follows integrated pest management (IPM) principles to monitor and respond to rodent activity efficiently and safely. The emphasis is first placed upon eliminating rodent food sources. Then the program emphasizes pest exclusion of sidewalks, foundations, stoops, or earthen space used by the rodents. Last, the program installs rodenticide bait or trap stations.



Photo: <http://www.freeimages.com/photo/1438278>

The most common rodent-related issues include rat infestations on the exterior of properties and mice or rats inside of buildings. Beginning in October 2014, the Rodent Reservoir Analysis identified and studied "rat reservoirs" in such neighborhoods as the East Village and East Harlem in Manhattan and Bronx's Grand Concourse. Inspectors set bait for the rats, closed burrows, flushed sewers, and worked with the neighboring community on best practices, such as better trash management programs, to avoid attracting rodents in the future. The city, which produces approximately 14 million tons of garbage annually, used to require actual garbage cans, but switched to plastic bags for convenience in the 1960s. Based on reports, the program has led to an 80% to 90% reduction in rodent sightings in the neighborhoods involved in the initiative.

In New York, the most common rodents are Norway rats and house mice. The program relies on experts in its Disease Control Division to notify the program about rodent-borne diseases. Approximately 10 to 20 cases of canine leptospirosis are reported each year. The agency's laboratory is capable of supporting investigations of rodent-related emergencies and protocols exist for collecting lab samples. Rodent bites/injuries are tracked through the animal bite surveillance system, which has reported approximately 400 rat bites per year. The program notes that the number of rodent-related bites/injuries is grossly under-reported.

The Rat Information Portal gives the public the facts about rats in New York.

## Public Education and Partnerships

The program does not have a rodent-specific communications plan, but the NYC DOHMH does have a communications plan. Health educators work closely with the program to develop pamphlets and presentations to different audiences through various communication channels. Program staff speak about rodent control at public events, such as community board meetings. The program disseminates rodent-related information through pamphlets, the website, and online resources.

The Rat Information Portal gives the public the facts about rats in New York. Through the Rat Information Portal, the public can find ideas about coordinated rat control efforts in their neighborhoods, generate maps of neighborhood rat inspection data, learn about the steps for finding evidence of rats on their property and how to manage them, and learn how to file a complaint.

The New York City Rodent Academy offers courses in rat management. The Rodent Academy provides training on how to manage rodent populations through IPM. The Rodent Academy provides training on the biology, behavior, and habitat of rodents, contributing factors to infestation, effective ways of evaluating site-specific responses and strategies, and effective communication strategies. Half-day trainings are targeted toward property managers, homeowners, tenants, and the local business community. Three-day intensive trainings are offered for pest management professionals, food safety personnel involved in rodent control programs, city employees, and others. Since 2005, the three-day academy has trained over 2,000 individuals from all over the United States.

Additionally, the program has established the Mayer's Rodent Task Force, a forum with more than 20 city agencies. The task force brings together senior-level managers from agencies responsible for property management and rodent control. The task force meets weekly. The task force is coordinated by the Mayor's Office of Operations and NYC DOHMH. NYC DOHMH steers the efforts for rodent control. An IPM-focused committee convenes twice a year to discuss topics such as pesticide use.

## Policies and Regulations

All laws and regulations related to rodent control are reviewed as needed, for example, as prompted by the Environmental Protection Agency's (EPA's) pesticide label changes and label reviews. The program was involved in the EPA's Risk Mitigation

Decision for Ten Rodenticides. Local Law 37 amends the administrative code of New York to promote the reduction of pesticide use by city agencies. The program enforces the New York City Health Code Article 151, which addresses rodents, insects, and other pests. The program makes an effort to educate and inform the public about any changes in laws or regulations, specifically through seminars and the Rodent Academy.

## Rodent Control Program Workforce

Processes exist to ensure employees have proper certifications. Education of professional rodent control staff in all city agencies is also important to ensure that staff and managers are current on best practices. Hundreds of rodent control staff have attended trainings such as those held by the Rodent Academy. Program staff incorporate and apply newly identified best practices acquired from attending national and international seminars and reading pest management journals.

## Evaluation and Research

The program is constantly evaluating its rodent control activities; for example, inspections and exterminations have a quality-assurance component. The program has observed positive outcomes, but sustaining positive outcomes can be difficult over long periods of time. The program found that rounds of inspections conducted in neighborhoods, combined with prompt communication with owners, publication of findings, and fines for noncompliance, reduced the prevalence and severity of rat infestations in a large area with a history of severe rat problems.

The program partners with local universities to conduct research related to rodent control and other vector priorities. The program shares and promotes its own best practices with stakeholders and peers, specifically practices related to baiting and trapping.

## Conclusion

Some significant challenges for rodent control include lack of science and research. For example, more research could be conducted on the profiling of different rat ecosystems (i.e., descriptions of environments, behaviors exhibited, and genomic analysis) and the surveillance of rats arriving on ships or trains. A national group could host a biannual rodent control research symposium to encourage and promote collaborations and research and to raise awareness of the importance of rodent



control. Additionally, property owners may lack an understanding of rodent control, funding, and resources. With enough staff, funding, public education, resources, and technology, rodent control can be successful. Rodent control activities must be proactive and sustainable; rodent control cannot be done solely based on complaints. More support is needed from federal, state, and city governments to combat rodents and to hold agencies and businesses accountable for their role in controlling rats.

Overall, some of the rodent control program's greatest successes and innovations include rodent indexing (proactive inspections), the Rodent Reservoir Analysis pilot project, the Rat Information Portal, the Rodent Academy, and the Mayor's Rodent Task Force.

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# Rodent Control Program Assessment: Shelby County (TN) Health Department

July 2015

## Introduction

Rodents cause damage by burrowing holes, tearing through trash bags, eating gardens, and gnawing through infrastructure. To combat this problem, the Shelby County Health Department Rodent Control Program is surveying the community, investigating complaints, educating the public, enforcing local ordinances related to rodent activity, and controlling rodent populations to secure public health and safety. The Rodent Control Program serves roughly 900,000 people residing in seven cities and towns.

The Rodent Control Program is a branch of the Environmental Health Services Bureau, Vector Control Section, which includes mosquito, rabies, and rodent control. The Rodent Control Program has been operating for approximately 10 years.

The Rodent Control Program is fully funded through a Tennessee-legislated Vector Control Fee, which consists of \$0.75 per month issued on utility bills. Allocations of this fee are committed to rodent control, but most funds are allocated to mosquito control. Allocations are flexible; for example, more funds can be allocated toward rodent control if rodent problems are significant. Rodent control funding has remained the same for the past five years.

## Rodent Control Activities

As part of rodent control monitoring and tracking activities, the Rodent Control Program follows integrated pest management principles to monitor and respond to rodent activity efficiently and safely. In 2014, the Rodent Control Program responded to 175 to 200 complaints on average per month, depending on the season. The complaints were recorded in a database. The information received from complaints and observations was recorded and tracked with tools such as geographic information system (GIS). After a complaint was submitted, staff observed the complaint area, placing Environmental Protection Agency-certified rodenticides in rodent holes when uncontrolled populations were identified. Additionally, staff were unable to enter private homes or businesses and were strictly limited to observing and placing rodenticides around the perimeter of buildings.

In Shelby County, the most common rodents are roof rats and Norway rats. The Rodent Control Program neither actively captures rodents nor tests for pathogens or ectoparasites. The program does not track rodent-borne illnesses, bites, and injuries but relies on experts in its Epidemiology Division and hospitals to notify the program. In the past year, the program was notified about no rodent-borne diseases. Compiling all data received,



Photo: <http://www.istockphoto.com/photo/brown-rat-rattus-norvegicus-26387592>

the program is able to survey the geographical area to improve surveillance techniques, better enforce the government codes regarding rodents, and monitor health outcomes.

## Public Education and Partnerships

Taking information the program has gathered about the rodent problem in Shelby County, staff created outreach programs to educate the public. While the program does not have a rodent-specific communication plan, staff do speak at various public events about rodent control. The program has dedicated an outreach and educational coordinator to conduct rodent control education and outreach at local community events. The program also provides free information to the public both at the health department office and online.

## Policies and Regulations

The Rodent Control Program's policies and training manuals relating to rodent control are under revision. All laws and regulations related to rodent control are reviewed annually. The Rodent Control Program makes an effort to educate and inform the public about any changes in laws or regulations, but an assessment has not been made to monitor public compliance with these laws.

The Rodent Control Program aims to proactively control the rodent population by continually spreading awareness in the community, ensuring that local ordinances are being enforced, and eliminating rodent infestations when they directly threaten public health in Shelby County.



## Rodent Control Program Workforce

All employees are certified pesticide control operators. The Rodent Control Program health department is creating a written standard of practice for requiring certification for all employees.

## Evaluation

Currently, no official evaluation plan exists for the Rodent Control Program in Shelby County, but an observed outcome of followed-up complaints demonstrated that the rodent problem was less severe than originally reported. The Rodent Control Program noted that, after intervention and education, the number of rodent-related complaints began to decrease.

## Conclusion

The most significant challenges for the Rodent Control Program involve public knowledge and awareness of rodent control, for example, making the public aware that rodent control inspectors cannot enter private homes or business. Also, there is general misinterpretation that the Rodent Control Program acts as an alternative pest control service.

The success of the Rodent Control Program was made possible by the environmental courts' ability to be proactive and enforce the local rodent-related codes, for example, trash regulations. The effective work done by the Rodent Control Program resulted in no cases of rodent-borne illness, injury, or disease reported or transmitted in Shelby County.

In the future, the Rodent Control Program hopes to develop a more effective educational outreach program for rodent control. The Rodent Control Program is also working toward training staff to operate GIS programs to track rodent activity and record complaints more efficiently.

Overall, the Rodent Control Program aims to proactively control the rodent population by continually spreading awareness in the community, ensuring that local ordinances are being enforced, and eliminating rodent infestations when they directly threaten public health in Shelby County.

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# Rodent Control Program Assessment: Philadelphia Department of Public Health

July 2015

## Introduction

Philadelphia has both vacant buildings and beautiful inner-city neighborhoods and parks that rodents are inhabiting. The well-established Vector Control Program within the Environmental Health Division of the Philadelphia Department of Public Health has kept the rodent population at bay for over 100 years. This program is fully funded through the city's general fund, and the budget has remained the same for the past five years.

## Rodent Control Activities

The Vector Control Program is both a proactive and complaint-based program. Generally, the program responds to complaints about rodents in residences and outdoors. Environmental health inspectors examine sites, treat problems, and recommend ways to keep residences rodent-free. In Philadelphia, the most common rodent is the Norway rat. These rats generated as many as 600 rodent complaints each month in 2014, which were received on a local hotline and recorded in a database. To monitor and control rodent-related activity effectively, the program uses integrated pest management principles (IPM). Program staff both reactively and proactively combat rodent infestations. While they continually respond to complaints, they also map and track the location of rat populations to handle overpopulated areas. Staff have a working list of 50 to 75 problem sites that are regularly monitored.

When staff respond to a complaint, they are trained to identify a rodent's entry points. They survey the area and use rodenticides where needed. The program has mechanics on staff that perform 80 to 100 rat-proofing services each year, including filling holes with concrete and minor plumbing repairs.

The program relies on experts in the Division of Disease Control to notify the program of any rodent-borne diseases. The city had no rodent-borne diseases within the past year. If a rodent-borne case were reported, the program would respond with IPM control measures, inspections, and site visits. The program recently hired an environmental public health epidemiologist as part of a plan to develop a surveillance plan for rodent control efforts. The program tracks rodent-related bites/injuries through a complaints database; staff are also notified via the Division of Disease Control. In the past year, the program has been informed of approximately two to three rodent-related bites/injuries. The program currently does not capture rodents, but it did so in the past, nor do staff test blood for pathogens or comb for parasites.



Staff at the Philadelphia Department of Health

Photo courtesy of the Philadelphia Department of Health

## Public Education and Partnerships

While the program does not have a rodent-specific communications plan, the Vector Control Program has established several educational outreach programs to keep the public up-to-date on how to handle rodent and other vector-related problems. For example, in the neighborhood program, rodent control staff educate the public about best practices for avoiding rodents, such as using metal containers for food or not taking out trash until the morning of trash day. The program also provides information about rodents on its website and provides advice during complaint follow-ups.

To combat severe rat infestations, the Vector Control Program partnered with several city departments. For example, staff worked with the city water department, parks and recreation, and neighborhood and community organizations. These collaborations helped create permanent, successful solutions to rat infestations.

## Policies and Regulations

The city's health department reviews any local regulations and ordinances related to rodent control, such as the Philadelphia Property Maintenance Code. Recommendations from the Vector Control Program can be made through the commissioner or deputy of health in Philadelphia. All rodent control measures must be in accordance with Regulations of Pennsylvania Department of Agriculture (PDA) Title 7, meaning all rodenticide applications must be made by a PDA-licensed pest control operator, applying only Environmental Protection Agency-registered pesticides consistent with the label.

The Vector Control Program has been securing the health of the public for over 100 years by controlling the rodent populations and will continue to do so for years to come.



As a general policy, the Vector Control Program cannot recommend people to private rodent control companies, but staff can educate the public about what kind of company to hire and how to avoid pests on their own. The Vector Control Program also has a policy requiring that every complaint be addressed within 72 hours.

## Rodent Control Program Workforce

Processes exist to ensure employees have proper licenses and certifications. All Vector Control Program staff are certified pest control operators. The program has an internal performance management plan. Monthly trainings continually strengthen the staff's ability to manage rodent populations and their public health implications. Program technicians are expected to apply newly identified best practices.

## Evaluation

Currently, the program does not have a rodent-specific evaluation plan, but there is a comprehensive evaluation of the Environmental Health Division. To assess progress and project new ways to improve existing programs, the Vector Control Program team meets annually.

## Conclusion

A significant challenge for the Vector Control Program is hiring new staff. Moreover, the Vector Control Program is having difficulty raising awareness of the issue and filling vacant positions. Another problem for the program is getting additional funding from the city. Despite difficulty obtaining funding, a major success is the program's ability to demonstrate its worth and value as a public health entity in Philadelphia.

The program has successfully demonstrated the value of having a vector control program. An example of a success for the Vector Control Program was work in the Historic Love Park and Rittenhouse Square. On these projects, staff partnered

with many different departments and organizations to control the infestation. The teams collaborated to change trash cans, plant different vegetation, use specific sizes of gravel, and educate the community and nearby businesses about how to avoid rodents. The program successfully managed the rodent population in these areas due to the collaboration of different organizations and the collective use of IPM.

In the future, the Vector Control Program hopes to make more training available to staff and have staff attend a professional conference on rodent control. The Vector Control Program has been securing the health of the public for over 100 years by controlling the rodent populations and will continue to do so for years to come.

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# Rodent Control Program Assessment: Department of Health in Washington, DC

July 2015

## Introduction

In Washington, DC, rodent control is conducted by the Rodent and Vector Control Division within the Health Regulation and Licensing Administration, Office of Food, Drug, Radiation and Community Hygiene, of the Government of the District of Columbia Department of Health. The program has been around for almost 50 years. Rodent control activities are funded by local support. The funding for rodent control has fluctuated within the past five years.

## Rodent Control Activities

As part of rodent control activities, the Rodent and Vector Control Division is both a proactive and complaint-based program. The program's integrated approach includes community outreach, surveys, abatement, enforcement, and cooperation with other city agencies. The program's abatement efforts use registered products to bait rodents in outdoor burrows on public property. The program will also bait private property in certain circumstances. The program receives rodent complaints via the city's 311 line. Complaints are tracked via a database. The program dispatches rodent control specialists within two days of a complaint. The program references historical data and trends, such as rodent complaints, when performing rodent control activities. In 2014, the program received approximately 250 complaints per month, depending on the season. The program follows integrated pest management (IPM) concepts in its rodent control efforts.

In Washington, DC, the most common rodents are Norway rats. The program relies on being notified of cases of rodent-borne diseases by the health department's Epidemiology Division. In the past year, no cases of rodent-borne diseases were reported. If a case were reported, staff would respond with IPM control measures, inspections, and site visits. The health department does not have a laboratory. The Department of Forensic Science's laboratory is capable of supporting investigations of rodent-related emergencies. The program does not track rodent-related bites or injuries.

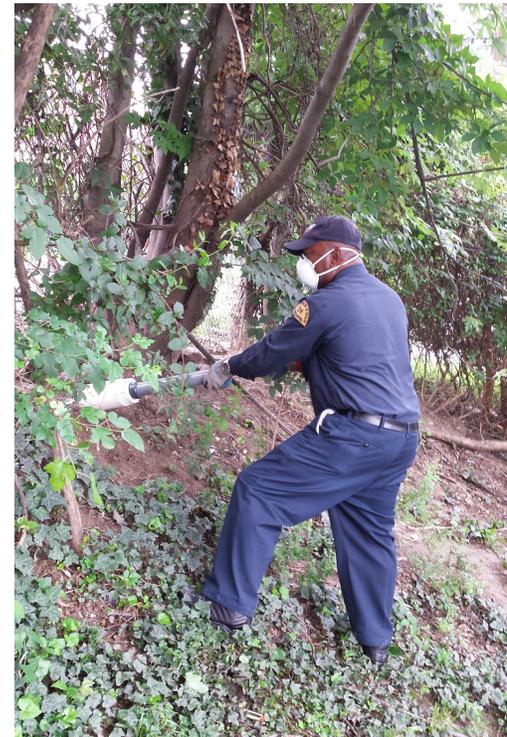
The program conducts community assessments to identify rodent issues, for example, by using Geographic Information Systems (GIS) technology. The program is exploring handheld devices for enforcement and tracking. The most common rodent-related issues include property and infrastructure damage, rodent sightings, and infestations. The program does not capture rodents as part of its management and surveillance activities.

As a general policy, staff may not recommend people to private rodent control companies, but staff may educate the public about what kind of company to hire and how to avoid pests. The program also requires that every complaint be addressed within 72 hours.

## Public Education and Partnerships

The Rodent and Vector Control Division does not have a rodent-specific communications plan, but an agency-wide communications plan exists. Using printed media, TV, and radio, the program distributes information through schools and public and private partners. The program develops materials and resources for different communication channels and audiences, such as for non-English speaking populations. The program provides information to the public on its website. The program's primary goal is to educate people and change behavior to mitigate the causes of rodent activity, thereby improving public health.

The Rodent and Vector Control Division works with the DC Department of Public Works to provide public, live Web chats or "Rat Summits" to discuss how residents can control the rodent population through proper sanitation. In addition, the program partners with the National Park Service, commissioners, and city leaders to solicit input on key decisions. Such interagency communication ensures a citywide enforcement structure in which each agency participates in achieving neighborhood goals for cleanliness, safety, and healthy environments. For example, the program alerts the health department's Food Protection Program of specific areas where waste food sources contribute to rodent activity in residential neighborhoods or commercial neighborhoods. The Food Protection Program initiates enforcement at food establishments if needed.



*Photo courtesy of the Government of the District of Columbia Department of Health*



## Policies and Regulations

The program has numerous laws and regulations, internal handbooks, and standards of practice. The program's operational plans include the daily functions of pest controllers and code enforcement officers. Regulations related to rodent control include Health Nuisances Regulations, Health Nuisances-Rodent Control Regulations, Litter Control Administration Regulations, and Rodent Control Infractions Regulations. In 2000, code enforcement legislation established initial civil penalties for conditions conducive to the proliferation of the rodent population. The program reviews all laws and regulations related to rodent control as needed. For example, the program recently updated rodent regulations to include more residential enforcement. The program makes an effort to educate and inform the public about any changes in laws or regulations. The program has strict commercial enforcement power but limited residential enforcement power. Other agencies have cross-jurisdictional authorities for code enforcement; for example, the Department of Public Works enforces sanitation violations that encourage rodents.

## Rodent Control Program Workforce

Processes exist to ensure all employees have the proper licenses and certifications. All pest controllers are licensed and maintain those licenses every three years. The program also provides in-house training, such as GIS training, and opportunities for external training and continuing education. The program's internal performance management plan describes positions, capacities, performance, and evaluation of performance. Program staff incorporate and apply newly identified best practices acquired from attending national and international seminars and reading pest management literature.

## Evaluation and Research

An evaluation plan measures program performance, effectiveness, stakeholder satisfaction, and whether the process has improved quality of services. The program has observed a decline in the number of complaints as a result of new trash bins, increase in code enforcement, increase in pest control services, and IPM. The program conducts research with consultants and research organizations. This research focuses on general rodent control practices and recommendations. Staff also attend educational seminars on reducing rodent activity.

## Conclusion

Challenges for the program involve the issue of federal land versus city land in Washington, DC. Approximately 42% of the land in the district is federal land. The federal government has an entirely different approach to rodent control, which also impacts the city. The program has been working with the Department of the Interior to coordinate a federal-state approach to rodent control. Additionally, the health department faces challenges in educating the public about the causes of rodent activity. Staff also strongly believe that numerous city agencies, in addition to the health department, should control the causes of rodent activity. However, staff lack guidance and best practices on how to implement and successfully maintain interagency or interdepartmental urban strategic planning for rodent control. Overall, the Rodent and Vector Control Division has a very comprehensive rodent control program geared toward understanding the patterns of rodent behavior, not just extermination.

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# Rodent Control Program Assessment: Multnomah County (OR) Department of Public Health

August 2015

## Introduction

In response to the bubonic plague epidemic in San Francisco in the early 1900s, a city health official in Portland, OR, launched a response, helping to pass laws to fumigate all ships entering port, installing screens on buildings containing food, and paying rewards for captured rodents, which were burned immediately. Presently, in Multnomah County, rodent control is conducted by the Vector Control Program within the Environmental Health Services division of the Multnomah County Health Department.

The Vector Control Program has conducted rodent control activities for over 40 years. The program is funded through local support, and the funding for rodent control has decreased within the past five years. This decrease in funding has resulted in staffing and activity cuts to the program. In the past 15 years, the program has been reduced from 2.5 full-time employees to just one full-time employee. The program has lost the ability to test routinely for new rodent species and emerging or endemic rodent-borne diseases and has decreased some services and educational outreach.

## Rodent Control Activities

The Vector Control Program is complaint-driven and does not actively seek out rodent infestations. The program follows integrated pest management (IPM) concepts in rodent control efforts. For example, the program advises that individuals first use the least toxic form of rodent control and provides free, non-chemical, mechanical snap traps. Rodenticides are used only for complaint-based sewer baiting. Last year, the program responded to approximately 80 complaints per month, depending on the season. The most common rodent-related issues reported include unsecured food sources, housing infestations, and property damage. Complaints dictate what areas for the program to inspect, and staff address complaints in the order in which they are received. However, staff generally prioritize complaints that involve restaurants, schools, and public areas, among others, due to the number of individuals at risk of exposure. Staff track and record complaints and inspections in a database and associate them with a physical property address. Numerous components of this database are tracked and categorized for analytical purposes. The program references historical data and trends for internal purposes or media inquiries.

In Multnomah County, the most common rodents are the roof rat, Norway rat, house mouse, and deer mouse. The program actively captures rodents every few years but does not trap or test for pathogens or ectoparasites. The program uses tools



Photo courtesy of Multnomah County Department of Public Health

such as Geographic Information System (GIS) to support the monitoring of rodents. The program coordinates with experts in the Communicable Disease division and Oregon Health Authority to notify the program about rodent-borne diseases. While the program has been notified about no rodent-borne diseases in Multnomah County in the past year, the program had previously documented some particularly concerning rodent-borne diseases, such as Hantavirus and *Toxoplasmosis*. The agency's laboratory is capable of supporting investigations of rodent-related emergencies and protocols exist for collecting lab samples. The program also partners with the Oregon State Veterinary Diagnostic Lab. In addition, the program relies on the Communicable Disease division, public complaints, and medical centers for notification of rodent-related bites/injuries. Oregon registered only 17 rodent bites over the two years from 2010 to 2012, not one of them in or near Portland.

## Public Education and Partnerships

While the program does not have a rodent-specific communication plan, the health department does have a communications plan with guidance on developing materials for different audiences and communication channels. The program educates the public about prevention, control, and identification. Program staff speak at public events on the topic of rodent control, post rodent control information publicly, and provide information upon request. The program works with local departments and agencies, such as parks and recreation, and leads a local coalition where multiple partners have a forum to work together on rodent control activities.



## Policies and Regulations

Multnomah County Health Department has numerous policies for rodent control, ranging from field work to guiding principles for the program. The program's surveillance, education, and prevention and control activities are done in accordance with and authority granted from Oregon Revised Statute 452. One law relevant to Portland's rodent population, which was passed in the 19th Century and is still enforced, requires that trash be kept in sturdy rodent-resistant containers with tight lids. All laws and regulations related to rodent control are reviewed as needed. The program educates and informs the public about any changes in laws or regulations and assesses the ability of relevant community members to comply with the laws and regulations.

## Rodent Control Program Workforce

Processes are in place to ensure all employees have the proper certifications and trainings. The program has a workforce plan, but lack of funding has limited how strategic this plan can be.

## Evaluation and Research

The program does not have an official evaluation, but the public may take a survey through the health department's website to provide feedback on local vector control. The program partners with local universities to conduct research related to rodent control and other vector priorities. For example, a recent study investigated local Norway rats and roof rats and their prevalence for three zoonotic diseases—hepatitis E, *Leptospirosis*, and *Toxoplasmosis*. Of 142 serum samples, 5.63% tested positive for hepatitis E, 7.04% were positive for *Toxoplasmosis*, and 13.56% were positive for *Leptospirosis*. Three rats were found to be infected by more than one zoonotic agent.

## Conclusion

The most significant challenges for the program include the lack of funding, staff, and training opportunities. The limited budget for additional staff prevents the program from evolving beyond a complaint-based model. The program aims to incorporate more community feedback in rodent control work, but doing so is difficult with staff shortages. Overall, the program performs complaint-based inspections, provides technical assistance to property owners and community organizations, provides community education, and performs rodent surveillance for speciation, ectoparasite identification, and rodent-borne disease.

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# Rodent Control Program Assessment: Austin/Travis County (TX) Health and Human Services Department

July 2015

## Introduction

In Austin/Travis County, rodents are invading neighborhoods, damaging property, and creating public health concerns. The Austin/Travis County Health and Human Services Department's Environmental Health Services Division has a Rodent and Vector Control Program that handles all rodent, mosquito, and other vector-related problems in the area. This program has been operating for just over 20 years. Funding for rodent control activities is located within the Rodent and Vector Control Program budget, where mosquito control uses the majority of the funds. The program is funded primarily through local support, and the funding for rodent control has decreased within the past five years. This decrease in funding has resulted in fewer rodent control staff.

## Rodent Control Activities

The Rodent and Vector Control Program is complaint-based and does not actively seek out rodent infestations. The program assists property owners with eradicating both mosquitos and rodents on their property. In 2014, the county received approximately 10 rodent-related complaints each month; the majority were about the Norway rat, roof rat, and house mice. To submit a complaint, residents call a phone line and leave a message. The program records and tracks the complaints in the Environmental Health Services database.

While the program does not yet use geographical information system (GIS) mapping for rodents (GIS is currently used only for mosquitos), staff have identified problem areas such as old neighborhoods where rodents can nest easily or barns in rural areas. Using integrated pest management concepts, program staff visit complaint sites and analyze the area. For example, when following up on a complaint, an inspector surveys the perimeter of the building, the street, and surrounding homes and looks for rodent entry points into the property.

The program relies on being notified of cases of rodent-borne diseases by the Epidemiology and Health Statistics Unit. In 2014, no cases of rodent-borne diseases were reported. If a case were reported, the program would respond by visiting the site. The program does not track rodent-related bites/injuries.

In 2008, the county experienced an outbreak of murine typhus, with 33 confirmed human cases. To contain the outbreak quickly, the Centers for Disease Control and Prevention worked



Photo: <http://www.freeimages.com/photo/1363440>

closely with the Austin/Travis Health Department. Health officials conducted an external site assessment of the physical property, including evaluations of environmental factors such as housing structure, vegetation, water features, food sources, and evidence of animals present. When possible, officials asked household owners about their use of pesticides, ownership of domestic animals, use of flea-control products, history of flea infestations, and reported past evidence of rodents. Opossums were found to be seropositive for *Rickettsia typhi*, and although seropositive rats were rarely or never detected, *Rickettsia typhi* has historically been maintained among rats and oriental rat fleas. Typhus is now endemic in the area, and whenever there is a reported case, the program has protocols to investigate and control outbreaks.

## Public Education

The Rodent and Vector Control Program shares best practices and information about rodents and other vectors that can potentially compromise the public's health. In addition to presenting at community health fairs, staff educate the public when investigating complaints; for example, the program educates residents about how to store dog food, encourages residents to switch from plastic to metal or glass containers, and provides guidance on how to avoid rats or prevent them from returning.

In the future, the Rodent and Vector Control Program hopes to coordinate with a non-governmental organization to help people repair their homes and create long-term solutions for rodent problems.



## Policies and Regulations

The Rodent and Vector Control Program relies on the Code Enforcement Department to handle infestations in homes and rental properties, ensuring that codes and ordinances are upheld. Moreover, the Code Enforcement Department enforces any ordinance or law that affects rodent populations, such as those related to debris or substandard structures. Also, while the program cannot technically refer constituents to a private pest-control company, staff use informational handouts from Texas AgriLife and share best practices and strategies. The program has numerous laws and regulations to address rodent complaints from the public and to educate the public. The program has a five-year policy review process. Laws and regulations related to rodent control are reviewed as needed.

## Rodent Control Program Workforce

Processes exist to ensure employees have proper licenses and certifications. Staff must hold and maintain a Texas Department of Agriculture non-commercial pesticide license. The program also has an internal performance-management plan. The program offers opportunities for staff to attend training and continuing education courses to keep current on best practices.

## Conclusion

The biggest challenge for the Rodent and Vector Control Program is acquiring funding to help individuals fix their properties in a way that will create long-lasting solutions to rodent infestations. However, residents cannot always afford permanent solutions, such as repairing plumbing or holes in walls. The program is also having difficulty informing the public that the health department is not a pest control operation that should be relied upon annually to provide free, quick-fix solutions.

The program successfully educated and reached many different populations in the county, such as Spanish-speaking communities. The program also developed successful and effective ways to explain complicated rodent-related issues in simple, understandable terms.

In the future, the Rodent and Vector Control Program hopes to coordinate with a non-governmental organization to help people repair their homes and create long-term solutions for rodent problems. Also, staff hope to attend more trainings, especially those that cover the structural component of rodent control to learn how rodents enter and inhabit the inside of buildings. Overall, the Rodent and Vector Control Program will continue to work diligently to control the rodent population and improve public health in Austin/Travis County.

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