

Healthy Homes Alliance Integrated Pest Management Project

A three-year integrated pest management pilot project in Los Angeles' urban housing

May 1, 2012

Written by
Patty Ochoa, Physicians for Social Responsibility–Los Angeles
Principal Investigator: Martha Dina Argüello



With Support From:
Californians for Pesticide Reform
California Department of Pesticide Regulation
Coalition for Economic Survival
Healthy Homes Collaborative

Funding for this project has been provided in full or in part through a grant awarded by the Department of Pesticide Regulation (DPR). The contents of this document do not necessarily reflect the views and policies of DPR, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Table of Contents

1.0 Healthy Homes Alliance IPM Project Summary	2
2.0 Program Design	2
2.1 Identification of Buildings	2
2.2 Education	3
2.3 Implementation of IPM.....	3
2.4 Data Analysis	3
3.0 Pesticide Use Surveys	4-6
3.1 Survey Results	4-5
3.2 Survey Observations	6
4.0 Project Implementation	6-9
4.1 Orchard Property	6-7
4.2 Harvard Property	7-8
4.3 55 th Avenue Property	8
4.4 Hill Property	8-9
5.0 Communication and Training Materials	9
6.0 Final Project Results	9-10
6.1 Project Highlights	9-10
6.2 Project Challenges	10
6.3 IPM Practices Used.....	10
7.0 Policy Recommendations	11
8.0 Conclusions	11
9.0 Acknowledgments	11

1. SUMMARY

Both pest infestation and pesticide exposure seriously threaten the health of residents in multifamily housing. Often, both tenants and building personnel conduct broadcast and routine spraying of pesticides to address pest infestations, but these practices seldom manages the pests and can lead to illness. Many tenants and building owners use aerosol sprays to manage cockroaches exposing residents to harmful chemicals, but the infestation remains if the cockroaches have access to a water source. Alternatively, integrated pest management (IPM) practices combine green cleaning, building repairs to fix leaks and prevent pest entry, and, when necessary, the safe application of lower-risk pesticides. Such protocol can reduce cockroach infestation while also protecting the environment, property, and health. IPM programs focus on preventive measures to address the root cause of cockroach infestation—poorly maintained buildings with faulty plumbing and deteriorating water fixtures.

From 2009–2012, Physicians for Social Responsibility–Los Angeles, with funding from the California Department of Pesticide Regulation (DPR), conducted a three-year Healthy Homes Alliance IPM Pilot (HHA) Project in the City of Los Angeles. The HHA IPM Pilot project—based on a model developed by Boston Housing Authority and the Boston Healthy Public Initiative—identified buildings with cockroach infestations and worked with tenants, building personnel, and owners to train all participants and implement IPM practices. The three goals were:

1. Reduce the use of pesticides in multiunit housing
2. Measure the effectiveness of IPM practices in multiunit housing
3. Promote the effectiveness of IPM practices

2. PROGRAM DESIGN

The Healthy Homes Alliance partnership engaged community-based organizations, tenant rights groups, state-wide advocacy organizations, and a pest control operator (PCO) who offers IPM services. Martha Dina Argüello served as the principal investigator of the program.

Alliance Team:

- Californians for Pesticide Reform (CPR)
- Coalition for Economic Survival (CES)
- Colby Pest Control
- Healthy Homes Collaborative (HHC)
- Inquilinos Unidos (IU)
- Inner City Law Center (ICLC)
- Korean Immigrant Workers Alliance (KIWA)
- Esperanza Community Housing Corporation (EHC)
- California Department of Pesticide Regulation (DPR)
- Physicians for Social Responsibility-Los Angeles (PSR-LA)

Each member of the partnership played an instrumental part in the project identifying the buildings, educating participants, implementing IPM protocol, and analyzing data.

2.1 Identification of Buildings

Community-based organizations (CBOs) used existing relationships with community members in various neighborhoods in the City of Los Angeles to identify potential building sites and enroll buildings and participants in the project. CBOs enrolled the tenants in the project, conducted outreach to them, and initiated relationships with all stakeholders. During one-on-one visits with the tenants, the CBOs provided them with a memorandum of understanding explaining the responsibilities of the owner and the tenant in the project.

2.2 Education

To increase understanding of IPM, the Alliance Team presented tenants, building managers, and building owners with information on pesticide use, pest behavior, and IPM practices. During each training session, presenters provided tenants with green cleaning supplies, such as baking soda, vinegar, and borax. They also explained green cleaning recipes and strategies to discourage pests, such as proper food storage and clutter management. By presenting alternatives to pesticides, we sought to deepen awareness of pesticide exposure and strategies residents can use to safely prevent pest infestation. Ongoing training for the Healthy Homes Alliance Team was another important process of the project. All members of the Alliance Team participated in training on bed bugs, cockroaches, green cleaning, and how to conduct healthy homes visual inspections and sticky trap evaluations.

2.3 Implementation of IPM

Once participants were identified and trained on pest behavior and IPM, the Alliance Team began implementing IPM practices according to the following protocol:

- Gathered data on pesticide use and pest infestation. Sticky traps were placed at each participating unit and collected two days later. Sticky trap findings helped to assess cockroach infestations and identify the areas of the building with problems. The Alliance Team also conducted pesticide-use surveys during this phase of the project.
- Conducted green cleaning and IPM training sessions for residents with individual unit inspections.
- Sticky Trap Evaluation—Second set of sticky traps placed and collected two days later to evaluate any changes in roach infestation following green cleaning training.
- Blocked pest entry points by sealing holes and cracks with synthetic caulk. Additionally, reemphasized green cleaning with each tenant.
- Sticky Trap Evaluation—Third set of sticky trap placement placed and collected two days later to identify building infrastructure problems such as leaks contributing to the infestation. Alliance Team members met with the building owners to discuss repairs needed and develop an agreement with the owners regarding repairs that would be made.
- Building owners made structural repairs to the buildings such as fixing plumbing.
- Sticky Trap Evaluation—Fourth set of sticky traps placed and collected two days later to identify building areas still contributing to cockroach infestations.
- One-on-one intervention—the Alliance Team engaged tenants who continued to have high infestation levels and worked with the building owner to make better building repairs.
- Sticky Trap Evaluation—Fifth set of sticky traps placed and collected two days later to identify building areas that were still contributing to cockroach infestations and required lower-risk pest management application.
- IPM Pest Control Operator—certain units were selected where safer pest management practices such as gels would be used.
- Final evaluation—Sixth set of sticky trap placement was conducted to measure success of the project.

2.4 Data Analysis

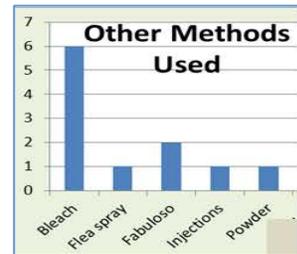
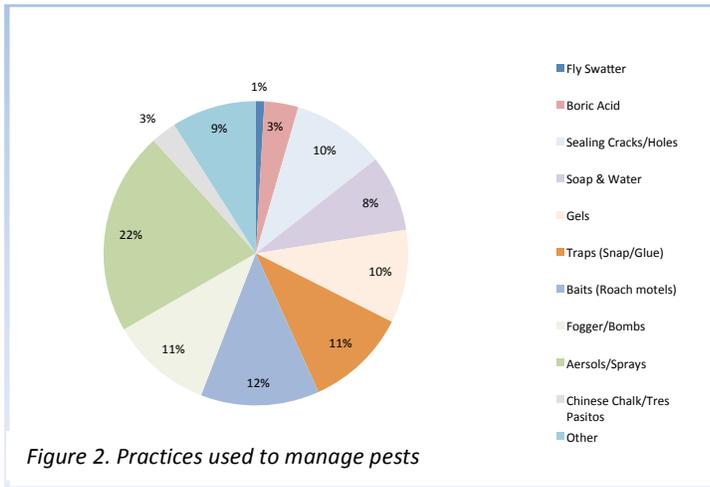
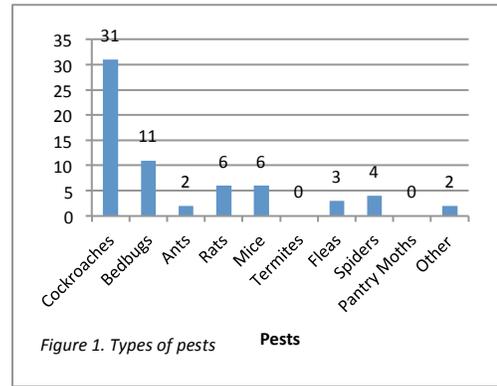
During each phase of the IPM protocol, the Alliance Team analyzed the data to evaluate progress, identify challenges, and determine next steps. Data gathering and monitoring were essential to help tenants and building owners and managers understand the IPM process and determine the best prevention strategy. While there was a pre-established timeline and protocol for the project, data evaluation determined the specific needs of each building, which sometimes required modifying the project timeline. For example, one of the buildings had a building-wide plumbing issue that required us to take longer in making repairs.

3. PESTICIDE USE SURVEYS

The Alliance Team surveyed tenants to measure pesticide use before the pilot IPM process began. We conducted 36 surveys and asked tenants to self-report their pesticide use as well as pesticide applications by building personnel. Findings indicate which pesticide practices are common at each building.

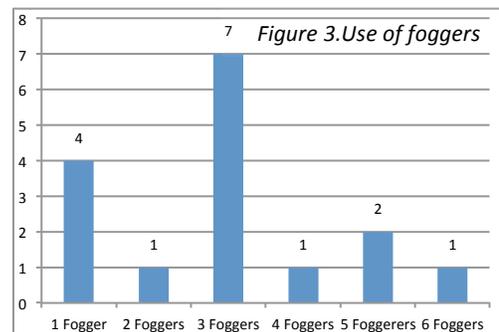
3.1 Survey Results

Types of Pests—While the buildings had problems with a variety of pests including bed bugs, rats, and mice—cockroaches were the biggest concern, with 31 out of 35 units (89%) reporting cockroach infestations (Fig. 1). Some units reported more than one pest problem.



Practices Used to Eradicate Pest—Initial surveys identified use of aerosol sprays as the most common pesticide practice, but most tenants used a combination of pesticide practices at one time (Fig. 2). For example, foggers were used in combination with aerosol sprays and baits. Respondents indicated that using multiple pesticide products increased effectiveness. Under other pesticides used, tenants reported bleach as the most common practice to eliminate pests.

Use of Foggers—Most tenants who used foggers reported using multiple foggers at one time (Fig. 3). Almost a quarter of the tenants surveyed had used three or more foggers at a time. Moreover, when asked if foggers led to a decrease in cockroaches, respondents indicated that infestation levels stayed the same.



Safety Measures—Many tenants did not follow safety precautions when applying pesticides (Fig. 4). Only about half of the tenants left their home when applying pesticides requiring some form of ventilation. The majority of the tenants, 24 out of 25, did not protect themselves with gloves or a mask when applying pesticides.

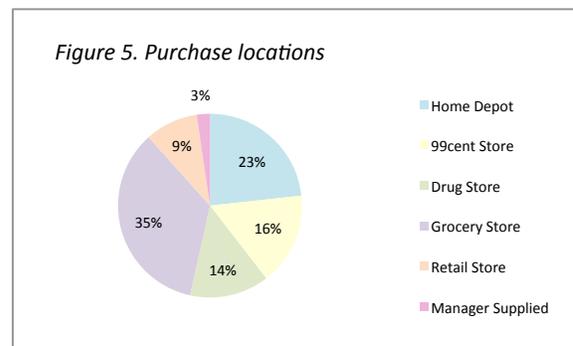
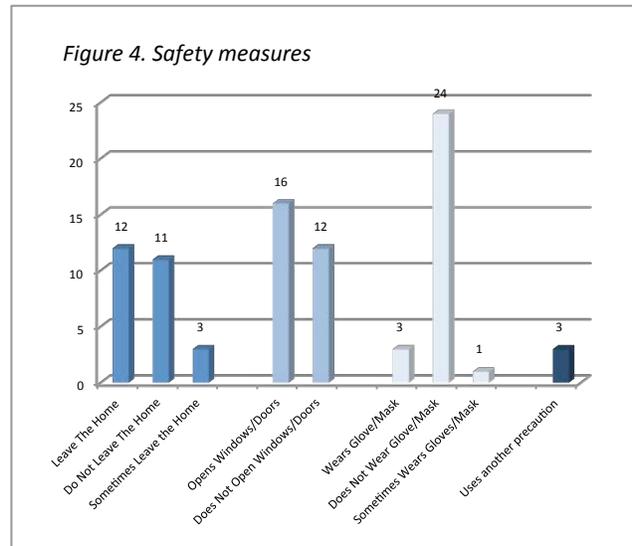
Purchase Locations—Tenants were asked to name the locations where they purchased their pesticides (Fig. 5). The local grocery store was the most common location, followed by Home Depot. The 99¢ Cent Store was the third most common location.

Pesticide Application—Tenants reported that the building manager applied aerosol pesticides as the most common pesticide practice (Fig. 6). Survey respondents living in the same buildings reported different pesticide application frequencies. For example, in one building, some tenants reported that pesticide application was conducted biannually while others reported that it was reported quarterly. One possible explanation for this variation is that pest control operators may frequent some units more often than others.

Most of the tenants responded that they were notified by the manager or owner of any pesticide application that would take place at the building. We did not ask if the tenants refused to participate in the application of pesticides at their unit or if they were provided with options for safer pest management.

Pesticide Use and Exposure—Exposure to pesticides can lead to symptoms such as difficulty breathing, blurred vision, eye irritation, nausea or vomiting, skin irritation, headaches, and dizziness.

Thirteen respondents reported suffering from at least one of the symptoms from this list (Fig. 7). Children are the most susceptible to pesticides. One of the tenants reported that their child vomited after applying pesticides, but this person did not attribute the sickness to pesticide application.



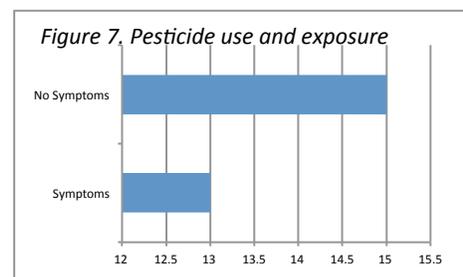
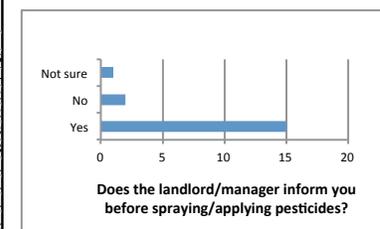
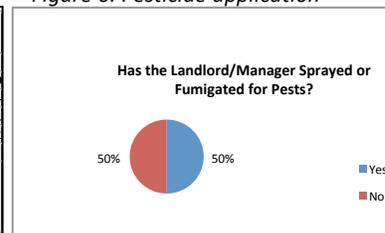
Where does the Manager Spray or Fumigate for Pests?

Locations	Frequency
Unit	10
Common Areas	4
Outside	1
Other Units	2

How often does the building get sprayed or fumigated for pests?

Fumigation Method	Frequency
No fumigation	6
Once A Year	4
2x Times A Year	2
4x Times A Year	2
Monthly	3
Doesn't Know	8
Once In A While	1
Once In 3 Years	1
Only when requested	1
Every 2 Years	1

Figure 6. Pesticide application



3.2 Survey Observations

- Tenants did not express a strong concern about the risks of pesticide exposure or reveal an awareness that pesticides can negatively affect health. Tenants assumed that applying multiple pesticides at the same time was more effective than using one pesticide product.
- Harsh chemicals such as bleach were identified as effective pesticides.
- Tenants did not always read directions on the pesticide label or CAUTION or DANGER advisories.
- Tenants were often the ones applying pesticides in their units. In some cases we found that tenants applied pesticides more frequently than did building personnel.
- Tenants viewed the application of pesticides as the primary mechanism for addressing pest problems, particularly cockroaches.
- Participants expressed an awareness of safer pest management or intervention practices but used them infrequently.
- Pesticide use was driven by immediacy rather than effectiveness. Tenants wanted solutions that provided immediate results over long-lasting ones, probably due to their frustration from constantly living with pests and not seeing results. Also, they were probably unaware that other practices (e.g., vacuuming and gel bait for cockroaches) were more effective than spraying.

The Alliance Team identified a need for further exploration of the tenant’s beliefs and knowledge about pesticides’ risks to human health. The Alliance Team identified the need for a wider emphasis on IPM and education about pesticide exposure. Children may become asthmatic or have allergic reactions from pesticide exposure, but many parents do not attribute their children’s illness to pesticide applications. However, after engaging in the project, many participants reported that they stopped using foggers and aerosol sprays. These behavior changes suggest that education and discussion about IPM and pesticide exposure can support families in making healthier choices.

4. PROJECT IMPLEMENTATION

During the study period, the Alliance Team enrolled four buildings in the pilot project (Table 1). Two of the buildings were located in South Los Angeles, one in Highland Park, and one in the Mid-Wilshire area. Three of the four buildings were constructed before 1930; the other building was constructed in 1989. We named each building according to the street on which it was located.

Table 1. Location of buildings, Los Angeles

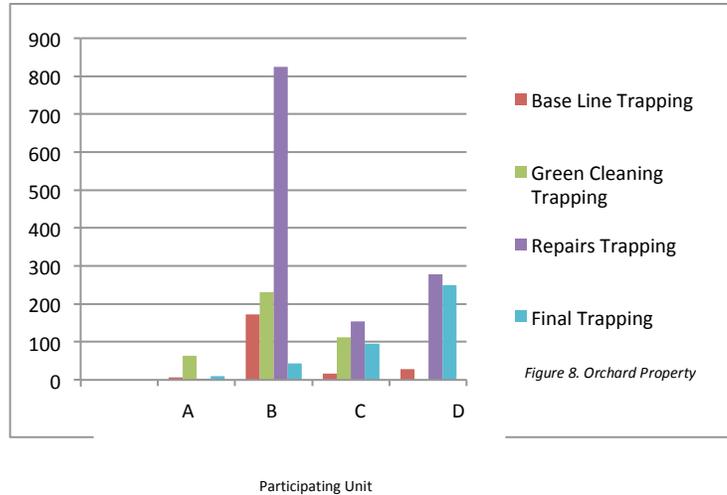
Property	Year Built	Area
Orchard	1922	South LA
Hill	1916	South LA
55th Avenue	1989	Highland Park
Harvard	1929	Mid-Wilshire

4.1 Orchard Property

The Orchard Property is a four-unit complex of two-bedroom units. The property was the first building enrolled in the IPM project allowing the Alliance Team to begin testing the IPM protocol.

Data Analysis—The initial baseline measurements using sticky traps found low cockroach counts, although tenants reported seeing higher numbers (Fig. 8). Cockroaches may have avoided areas of the building where pesticides were applied daily. For example, in one unit, a tenant reported using up to six foggers at a time. After asking tenants to stop spraying pesticides and to use IPM practices instead, we saw an initial increase in cockroach counts. Once pesticide residues on kitchen countertops and other areas were removed, roaches may have emerged from their hiding places and moved back to these areas. Also, roaches may have scattered from kitchens due to vibrations from pesticide spraying and then returned once tenants stopped spraying. The Green Cleaning Trapping number can be seen as the actual roach baseline count.

In addition to participating in the Alliance Team project, the Orchard property underwent window replacement as part of the Los Angeles Housing Department Lead Hazard Reduction Program (LHRP). Window replacement delayed implementation of the green cleaning and IPM intervention project. Cockroach counts increased after the windows were replaced, but at the time of the final roach count their levels were reduced.



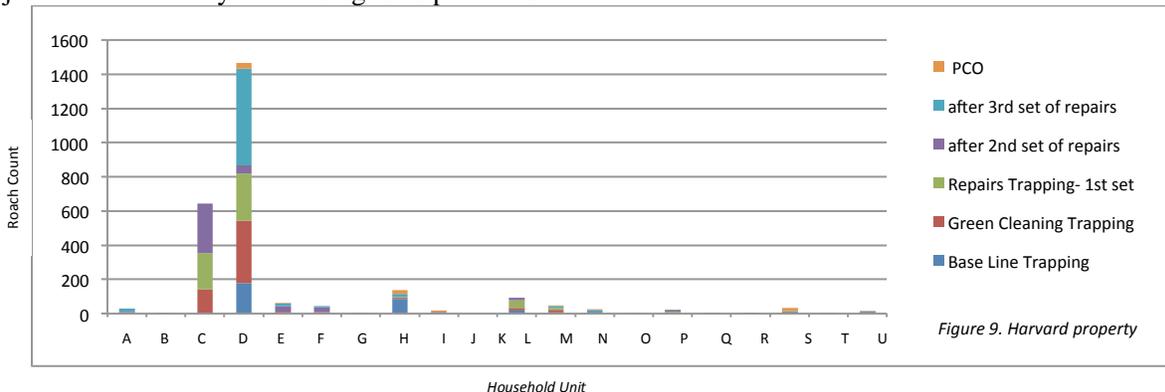
Data do not explain whether the IPM practices used in the building caused roach counts to decline. The window installation skewed the roach counts and impeded the identification of pest infestation and necessary building repairs. Additionally, after receiving the free window installments, the owner of the building opted out of the Healthy Homes Alliance Project. Though the Alliance Team did not complete the IPM protocol, we learned several key lessons:

- Tenants need to be encouraged to continue using green cleaning practices even after seeing roach reductions.
- Incentives to owners for participating should be provided *after* the owner makes the initial building repairs requested.
- Building repairs, which vary for each project, will affect the IPM process and timeline. Major repairs to plumbing are conducted in phases, which may extend the project’s timeline.

4.2 Harvard Property

The Harvard property is a 40-unit building of single- and one-unit bedrooms with a history of major water leaks. For example, a broken water pipe in the building’s basement and washroom flooded many of the first floor units. This building was infested with cockroaches as well as bed bugs.

At the start of the project we enrolled 30 units out of 40 units, with ten being vacant. As the project progressed, several tenants were frustrated with bed bugs and wanted to immediately use pesticide sprays, rather than wait until the Alliance Team could identify bed bug problem areas. Twenty tenants completed the project; four tenants opted out of the project because they wanted a pest control operator to address the bed bugs, while six tenants moved out of the building. All units were visited and sealed as part of building repairs, but we conducted sticky trap cockroach counts only in the units where the tenants participated in the project and where they were using IPM practices.



Data Analysis—Similar to the Orchard property, there was an initial increase in roach counts after tenants implemented green cleaning practices and then a decrease of roaches after repairs were made (Fig. 9). Due to water intrusion, the building required extensive infrastructure repairs. The Alliance Team and the building manager coordinated a three-step repair timeline.

First, all units were inspected, and where appropriate synthetic caulk was used to seal cracks and crevices to prevent pest entry. Second, building personnel replastered bathroom walls, repaired kitchen cabinets to seal holes, and did deep cleaning. The third set of repairs was conducted primarily on the first floor of the building because of high cockroach levels in those units.

Following the third step of the building repairs, a PCO who offers IPM services was brought in to address remaining pest issues. Colby Pest Control applied gel bait pesticides to the first floor of the building—primarily because the first floor roach counts continued to be higher than the rest of the building—and to units with bed bugs. At the conclusion of the project, the building achieved a 72% reduction in cockroaches.

Though the project did not focus on addressing the bed bug problem in the building, tenants reported a decrease of bed bugs due to the repairs, ongoing green cleaning and the application of low-risk pesticides. Some units reported an elimination of bed bugs in their units. When we left the building, the owner initiated IPM communication protocols for all units. As one precaution, when tenants moved out, the owner provided them with bed bug encasements for items they planned to throw away.

4.3 55th Avenue Property

The 55th Avenue Property was a ten-unit building with two-bedroom units. The building had been enrolled in Los Angeles Housing Department Rent Escrow Account Program (REAP). A building is enrolled in REAP after two or more Notices to Comply have been sent to the owner. Once in REAP, an escrow account is opened and tenants have the option of paying a reduced rent until the repairs of the building are completed. The building had been removed from the REAP program a month before the Alliance Team enrolled the building in the IPM project.

Data Analysis—Data for the building are inconclusive because we were only able to conduct an initial sticky trap test and another one after green cleaning. The owner opted out of the project before building problems were identified. The Alliance Team called tenants and notified them that the program would be terminated, and learned that the owner was threatening the tenants with eviction if they continued to participate in the project. We referred all tenants to tenant rights and legal aid services.

The owner's behavior was identified as a common tactic used to push tenants out of a building in order to increase rents. Making the building uninhabitable encourages tenants to leave, enabling an owner to rent the unit for more money. Only one of the ten apartments that we visited was in near-perfect condition. This unit was rented out to a recent college graduate of UC Berkeley. Lower-income residents of color faced the greatest roach infestation and lived in units needing the most repairs. Our experience with this building made us aware of the need to develop an educational component on tenant rights in the IPM process at nonsubsidized multiunit housing.

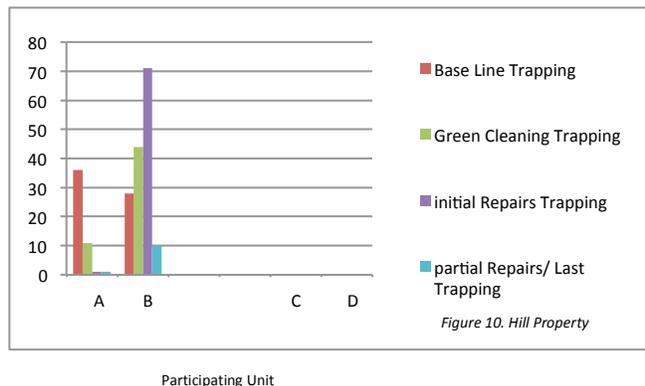
4.4 Hill Property

The Hill property is a four-unit, two-story building consisting of one- and two-bedroom units. The property was designed as a fourplex with two units on each side of the building. This building was also enrolled in the REAP program. However, unlike the 55th Avenue property, the owner had conducted more extensive building repairs to the unit, such as installing tile flooring to all the units. Additionally, the owner was more cooperative.

Because the building was enrolled in the project toward the end of the grant period, the Alliance Team modified the IPM process and combined the use of various IPM practices. The adopted timeline was:

1. First Visit—Established baseline by using sticky traps
2. Second Visit (two days after the first visit)—Collected sticky traps placed during first visit and conducted IPM and green cleaning training. Asked residents to use green cleaning and IPM practices for two weeks.
3. Third Visit (two weeks after the second visit)—Measured roach levels by placing sticky traps.
4. Fourth Visit (two days after the sticky traps had been placed)—Collected sticky traps and identified areas in the building with high roach infestation. Worked with the resident to identify reasons for high roach infestation, especially inquiring about water leaks.
5. Met with owner to present initial data and to discuss building repairs.
6. Worked with building personnel to seal cracks and crevices and make needed repairs.
7. Used low-risk pest management if needed.

Data Analysis—The results show a decline in roaches in the two units that had infestations (Fig. 10). Both units, located on the same side of the building, had extensive water leaks. The upper level unit (B) had a shower leak that penetrated through the walls into the lower unit’s bathroom ceiling (A). The units on the right-hand side of the building did not have any water leaks or roaches.



After the initial baseline roach trapping, we met with the owner to review a list of repairs necessary to address the water leaks in the building. The owners agreed to make the required repairs, which included extensive infrastructure work in addition to sealing cracks and crevices. The work took four months to complete. Low-risk pest management practices were used during this period. At the end of the project, the building achieved an 83% reduction in roaches.

The Alliance Team referred the building to the LHRP program to assist the owner with the repair costs. Learning from our experience with the Orchard property, the Alliance Team worked closely with the City of Los Angeles’ Housing Department to initiate the LHRP program after the owner had already made the building repairs that were contributing to the water leaks.

5. COMMUNICATION AND TRAINING MATERIALS

We developed educational materials and community tools for building owners, community based groups, and healthy housing policy advocates to promote IPM practices. These resources are accessible through www.CASaferPestControl.org, the web site developed for this project.

6. FINAL PROJECT RESULTS

6.1 Project Highlights

Participating buildings demonstrated a 77% reduction in cockroaches through the use of IPM practices. Other project successes include:

- Decrease of aerosol products used by the tenants. Although we did not conduct a follow-up to the pesticide use tenant survey, all the tenants we worked with began to use green cleaning and IPM practices instead of aerosols and foggers.

- The Harvard property cleaning personnel began to use green cleaning products when cleaning shared areas in the building.
- The building owner from the Harvard property continued to contract with the IPM PCO. The owner requires safer-pest management applications. Previously, the building owner would do routine, monthly pesticide spraying but now uses only gels and baits if necessary.
- The Harvard property underwent improvements to all of the units.
- The Hill property underwent improvements to the exterior and interior of the building.
- Combining green cleaning with IPM can remove home-based asthma triggers and allergens.
- Framing the messaging of IPM from protecting tenants' health to a cost-effective tool was key in making the project a success. The Alliance Team translated IPM as a cost-effective tool for building owners, as opposed to a health protective measure for tenants. In doing so, owners agree to the terms and conditions of the project including the up-front costs that are associated with implementing IPM practices.

6.2 Project Challenges

- Poorly maintained buildings pose a challenge to conducting effective and low-cost IPM. Three of the four buildings enrolled needed repairs beyond sealing cracks and crevices. Years of neglect to building maintenance contributed to faulty plumbing, deteriorating water fixtures and other substantive building problems. Without substantive repairs, IPM effectiveness is limited and tenants can become frustrated and resort to pesticide application.
- Public perception of traditional pesticide application as safe and healthy weakens the adherence to IPM practices. Ongoing education reinforcing IPM practices was necessary throughout the project in order to change participant behavior and develop awareness that pesticides are toxic materials. Once project participants understood IPM, they often inquired about where to purchase alternative and safer pesticide products.
- As the IPM process requires cooperation from multiple stakeholders, unreasonable and unethical landlord practices can impede tenants' rights to a healthy home. Strains in the relationship between the building owner and tenants can make it difficult to implement thorough IPM practices, particularly if the owner refuses to make necessary repairs in an attempt to displace tenants from the building. Establishing strong relationships with tenants helped to identify violations to tenants' rights that arise during project and refer tenants to legal aid services.
- Further partnerships to address bed bug infestations with IPM are necessary.

6.3 IPM Practices Used

A summary of the IPM practices used in the project are listed in the chart below:

Effectiveness of Each IPM Practice Used			
IPM Product	Results	Explanation	Cost
Green cleaning products (including borax)	After residents used green cleaning, there was an initial increase in cockroaches	Roaches are sensitive to the smells in harsh cleaning products. Once the product is not being used, roaches that were initially hiding in the walls will more than likely come out of hiding.	\$6.00 per unit for a month's supply
Infrastructure repairs (fixing leaks and moisture problems)	A decrease of roaches within two to three weeks.	Repairs were done on an ongoing basis. Tenants who used both green cleaning practices and received repairs to their units had better results.	Varies
Pest exclusion (combination of weather proofing the building and using silicon based caulk)	Steady decrease in roaches.	Caulking was applied to all the units.	\$1.85-\$6.20 per unit, depending on size
Safer pesticides (gels and baits)	Initial increase and then a visible decrease within two weeks	In units where roaches persisted after the above IPM practices were used, gel pesticides provided the best results	Varies- \$200 for forty-units

7. POLICY RECOMMENDATIONS

- Advance the standardization of IPM practices in urban areas. Buildings using appropriate IPM practices might be listed in a city-wide database on an IPM website clearing house. www.CASaferPestControl.org would be a good place to start.
- Incentivize the use of IPM practices in multiunit housing by providing building owners with matching grants to retrofit a building undergoing IPM.
- Create an IPM task force in the City of Los Angeles that will develop a plan to combat cockroaches, and review housing and health codes to promote IPM repairs over spraying.

8. CONCLUSIONS

Cockroach infestations and pesticide exposure threaten resident health in independent, multiunit housing. When green cleaning is accompanied by building repairs, pest exclusion, and limited application of safer pesticides, integrated pest management protocol can effectively manage cockroach infestations. Using IPM practices can improve habitability in buildings and leads tenants to report health benefits. However, this process requires ongoing education about pesticide harm to health and the cooperation of both tenants and building owners. Furthermore, to ensure building owners participation, messaging IPM as a cost-effective tool, rather than a health protective measure for tenants, is essential in having buildings owners use IPM practices.

9. ACKNOWLEDGMENTS

We would like to thank all the project partners, individuals, and building owners who worked with us throughout the grant. A special thanks to Maggie Aghaeipour, for allowing us to implement IPM practices in her building and for continuing to use safer pest management practices after the project's completion.

We would also like to thank the team of organizers who spent countless weeknights and evenings setting up roach traps and engaging tenants in the project. Thank you for your support and dedication to making healthier housing possible:

Carlos Aguilar
Kathy Attar
Monserrat Bernardino
Amelia Fay-Berquist
Patty Gurrola
Cindy Huerta
Mari Lobos
Jang Woo Nam
Jorge Villanueva
Carlos Zaragoza

And finally, a very special thanks to Nita Davidson who provided guidance and support throughout the project, and shared her wisdom on cockroaches.