TACKLING BED BUGS

A Starter Guide for Local Governments

Tackling Bed Bugs:
A Starter Guide for Local Government

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June 2015
Revised December 2015

If you are interested in providing feedback on this starter guide to help us improve it, email barta.juliann@epa.gov
We'd love to hear from you!

This starter guide was prepared by University of Washington Evans School of Public Policy and Governance students in partnership with the Region 10 Environmental Protection Agency's Pesticides and Toxics Unit. The starter guide and accompanying report fulfill the partial degree requirements for the Evans School students.
This starter guide is version 1.1—it has been revised by the Environmental Protection Agency following the student's original version.

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Acknowledgments

The following individuals provided information on their work as it relates to bed bugs or risk communication, or other input on the guide:

- Mike Bentley, Entomology Graduate Student at the University of Florida Extension School
- Kaci Buhl, Project Coordinator at the National Pesticide Information Center
- Matthew Davis, Program and Policy Development Specialist at the Multnomah County Health Department, Oregon
- Holly Thompson Duffy, Pesticide Program Manager at the Indian Health Service Portland Area (Formerly staff member at the Midwest Pesticide Action Center)
- Megan Dunn, Healthy People and Communities Program Director at the Northwest Center for Alternatives to Pesticides (NCAP)
- Erik Foster, Medical Entomologist at the Michigan Department of Community Health and Human Services
- Dawn Gouge, Urban Entomology Associate Professor and Associate Specialist at the University of Arizona
- Karen M. Griego, Healthy Homes Representative - Regions IX & X & Program Environmental Clearance O Officer at the U.S. Department of HUD, Office of Lead Hazard Control & Healthy Homes
- Larry Holyoke, Health and Environmental Investigator at the Local Hazardous Waste Management Program in King County
- Susan Jones, Associate Professor within the Department of Entomology at Ohio State University
- Ruth Kerzee, Executive Director of the Midwest Pesticide Action Center
- Nancy Lee, Founder and President of Social Marketing Service
- Alicia Leytem, Pesticide Specialist at the National Pesticide Information Center
- Alicia Lowe-Downes, Public Health Inspector for the Toronto Public Health Bed Bug Control Initiative
- Mike Merchant, Professor and Extension Urban Entomologist at The Texas A&M AgriLife Research and Extension Center, Dallas
- Dini Miller, Entomologist and Associate Professor in Urban Pest Management at the Department of Entomology, Virginia Tech
- Faith Oi, Entomologist at the University of Florida Extension School
- Cody Pace, IPM Consultant and Bed Bug Specialist at Eden Pest
- Karen Peterson, Pest Control Supervisor at Seattle Housing Authority
- Doug Proctor, Pest Management Professional at Seattle Housing Authority
- Rachel M. Riley, Senior Environmental Trainer at the Office of Lead Hazard Control and Healthy Homes. U.S. Department of Housing and Urban Development
- Derek Spencer, Communications and Outreach Manager at the Midwest Pesticide Action Center
- Jeffrey Strang, Housing Inspector at Multnomah County Health Department, Oregon
- US Environmental Protection Agency Bed Bug Workgroup members

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Introduction

Why are we here?

Bed bugs are unique. They are blood-feeding human ectoparasites that impact public health in many ways and are considered one of the most difficult pests to control in buildings.

Bed bugs are not known to spread disease,[1] but their bites can sometimes cause painful reactions in sensitive individuals. Some people may have mild to severe allergic reaction to the bites and scratching these bites can lead to secondary infections of the skin. Others may suffer from loss of sleep and anxiety, which may lead to or exacerbate existing mental health problems. Out of desperation, some people may misuse pesticides or try dangerous methods to control bedbugs that can have negative human health and environmental effects. Pesticide contamination can render buildings uninhabitable. EPA and CDC issued a joint statement in 2010 that reaffirmed that bed bugs are a public health pest.

Some bed bug populations have become resistant to many pesticides commonly used in homes. Bed bugs also hide in cracks and crevices where many in-home products do not reach them. Effective control efforts therefore need to include a variety of non-chemical tactics.

Considering the effect bed bugs have on public health and the challenges associated with their control, professionals and scientists agree; it takes a coordinated group effort to address bed bug infestations in a community.

How has this issue been addressed?

Laws and resources vary widely across the country. Communities must develop an approach that works locally and plan to sustain a coordinated effort.

- In Boston, Massachusetts, the City's Department of Inspection Services (ISD) enacted policies and started a public education campaign. The Boston Housing Authority (BHA) worked with experts to develop training and policies to stop the spread of bed bugs in multi-family housing. The number of complaints has been decreasing since 2012, ten years after the infestation took hold.

[1] Bed bugs have been documented as competent vectors of very few disease causing pathogens. Under normal living conditions, bed bugs have not been found to transmit pathogens to humans.

- In Cleveland, Ohio, a collaborative task force was developed including local health departments, non-governmental organizations, and businesses directly involved in the response to bed bugs. They have been meeting regularly since 2011.
- In Multnomah County, Oregon, which includes the cities of Portland and Gresham, the Department of Health took the lead, and established a bed bug hotline. They created training documents and compiled resources, responding to the needs of the community.

Let's dig in

The purpose of this starter guide is to provide local governments with useful and applicable information to aid them in supporting communities with bed bugs. The guide provides a comprehensive, high-level summary of the bed bug problem and suggestions on how to work towards control. It is meant for local governments in communities facing increasing bed bug infestations. The guide is designed to provide the following for local government:

- An overview and background on the problem of bed bugs
- Strategies and suggestions on policy tools to address the problem
- Information on organizing community-level responses
- Approaches to evaluate success of actions
- References to additional resources

Each community has unique circumstances and challenges that will require a customized response from local government. This starter guide is not intended to address every unique scenario. Instead, it presents considerations and ways to get started on building an effective community-level approach to addressing bed bugs.

Learn the Issue

Before tackling bed bugs on a community-level, it is important to understand bed bug basics. The meaning of *community* will vary from place to place, but it could mean a town, city, county or combination. This section of the starter guide presents the history of bed bugs, an overview of bed bug biology, and a summary of the bed bug problem. This background will help you and others understand how bed bugs can affect your community.

Bed Bug History

Bed bugs are not a new pest. Bed bugs have been common throughout history, but the distribution and intensity of infestations have fluctuated over time. In the early 20th century, bed bugs were very common. After World War II, bed bug infestations in the developed world declined for a period. As a result, social familiarity with the problem and methods to treat the pest also declined. The table below presents the prevalence and societal knowledge of bed bugs in the U.S. over time.[2]

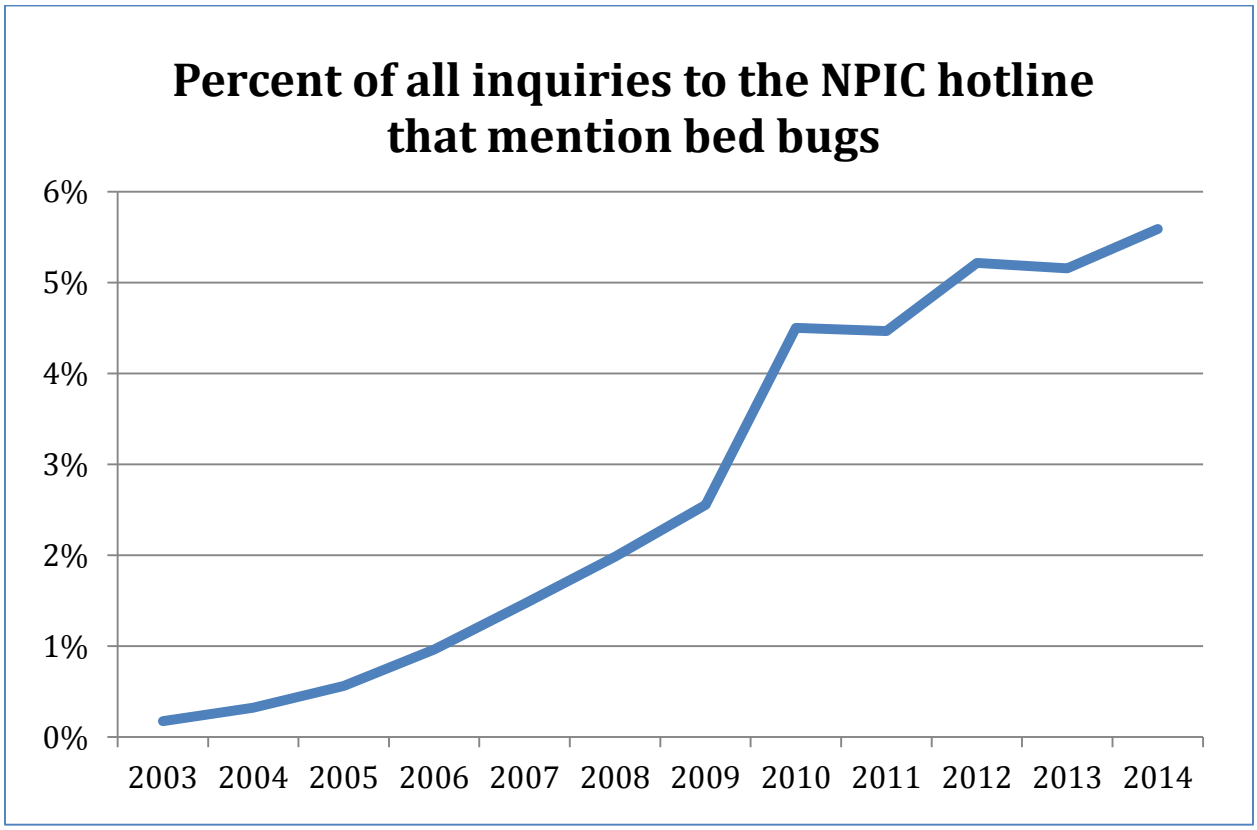
	Pre-1900	**1900-1940s**	**1945-1960**	**1960-1990**
Prevalence of bed bugs	Very common	Very common	Very common, but start to decline with DDT	Infestations are rare
Societal knowledge of bed bugs and treatments:	Very high	Very high	Declining	Low/basic lack of awareness

Levels of bed bugs and bed bug awareness in history

[2] The following sources were used to create this table: Biehler, Dawn Day. Pests in the City: Flies, Bedbugs, Cockroaches, and Rats. Seattle: University of Washington Press. 2013. Bed Bugs: The History of Bed Bugs. Accessed February 15, 2015 from http://www.bedbugs.org/the-history-of-bed-bugs/ Owen, James. *Bloodthirsty Bedbugs Stage Comeback in U.S., Europe*. For National Geographic News, May 13, 2004. Accessed February 22, 2015 from http://www.pestworld.org/all-things-bed-bugs/history-of-bed-bugs/

Bed Bug History

Since the 1990s, bed bugs have made a comeback and are now a common pest in the United States. The steady increase in the percentage of bed bug inquires made to the National Pesticide Information Center (NPIC) over the past decade indicates that public awareness and concerns about bed bugs are on the rise.



Bug Biology

Identification

- Color yellowish-white to reddish-brown
- Adult size about ¼ inch long, about the size of an apple seed
- Eggs can be seen with a magnifying glass; elongated in shape and clear-to-white in color
- Five nymphal stages, all of which feed on blood
- Shape and morphology is oval-shaped body with six legs and two antennae; varies from flat to balloon-shaped depending on how recently they last fed
- Leave dark feces marks in hiding places (mattresses, cracks and crevices)
- Leave nearly clear exoskeletons behind every time they shed, as well as blood spots on bedsheets after they feed.

Life Cycle

- Five distinct nymphal stages of development before reaching maturity
- Require blood meal to pass from one nymphal stage to the next
- Molt (shed) each time they pass through a stage of development, leaving nearly-clear exoskeletons behind
- Can breed directly with their own offspring
- Tend to breed faster during summer months
- Adult bedbugs can live over one year

Bed bug life stages. Photo credit: Allison Taisey

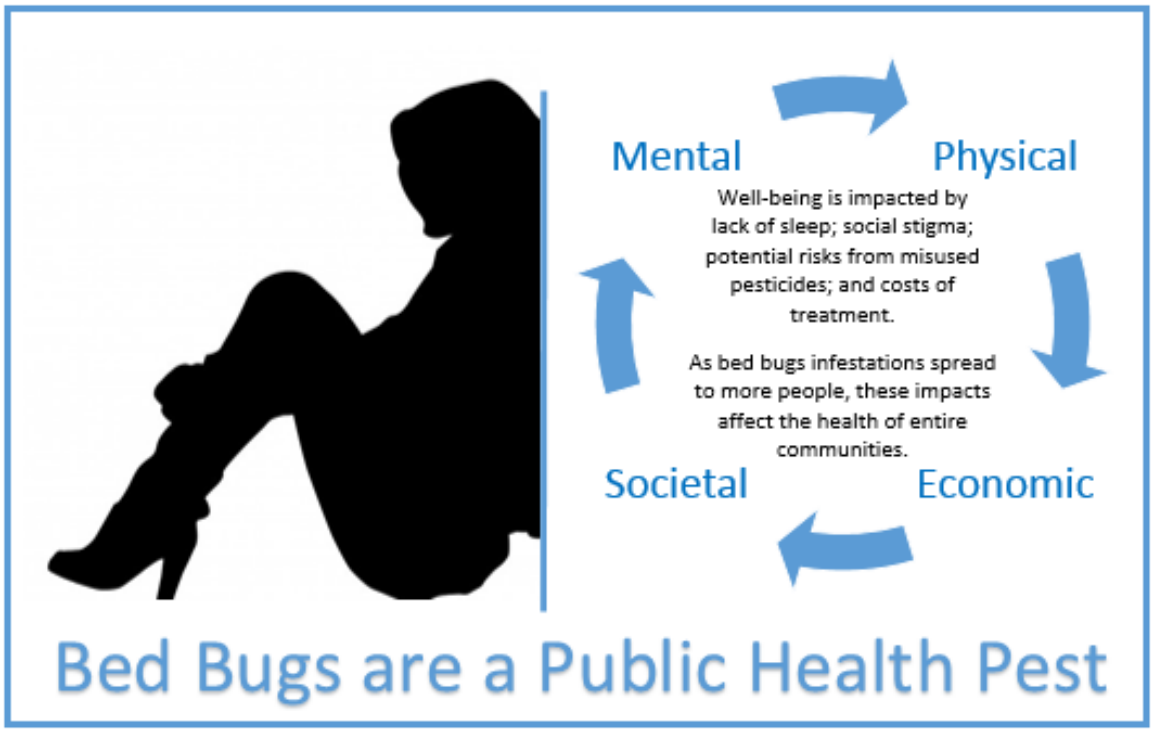
Resiliency

- Eggs laid intermittently in clusters; may be found in several locations
- Eggs are more difficult to kill than adult or nymphs
- Adults and nymphs may be able to survive for months without a blood meal
- Can regenerate infestations when even one pregnant female survives treatment
- Have developed some resistance to pesticides, and may require repeat treatments or different approaches. Bed bug resistance to pyrethroids, contained in many residential products on the market, is wide-spread.
- Adults can hide from pesticide applications or move along wires and walls to other areas.

A Summary of the Problem

While bed bugs are not known to spread disease, they are considered to be a pest of public health significance. Bed bug bites can cause allergic reactions and secondary infections in some people. Individuals who are living with bed bug infestations may be losing sleep, feeling overwhelmed by the problem, or being shunned by friends and family members who don't want the infestation to spread to their homes. Expenses related to bed bug management can be high when you factor in pest control company costs, time to clean and prep a home for treatment, and potential costs associated with the disposal and replacement of furnishings. Despair can lead people to drastic measures such as using home remedies containing hazardous materials that create a much larger health concern.

Multiple sectors of government are involved in bed bug management as bed bug-related concerns overlap with the work of agencies working on housing, public health, and toxic chemicals. As bed bug infestations spread from apartment to apartment, and throughout communities, the negative impacts associated with having a bed bug infestation can affect the well-being of an entire community. Local government leaders are best positioned to initiate a collaborative approach to find a solution that is efficient and lasting for their own community.



Collaboration is Key

Given that many different government agencies, non-profit organizations, and private sector businesses are likely addressing bed bug concerns for the people they serve, a broad, multi-level collaborative approach will help guide efforts to address the problem. The table below provides a list of stakeholders to consider involving in a collaborative approach and the places that may be prone to bed bugs.

People (stakeholders to consider)	**Places** (potential transfer points)
Residents: renters and homeowners Landlords/property managers Tenant unions Tourism and lodging entities Community groups (cultural and religious) Non-profit agencies Pest management professionals Businesses selling pesticide products Entomologists Land grant university cooperative extension staff Housing associations School nurses	Single and multi-family housing Nursing homes Laundromats Childcare centers Schools Hotels/motels Medical centers Shelters Public transportation Jails Libraries Movie theaters Almost anywhere that people gather

Barriers

Bed bugs are difficult to eradicate for a wide range of reasons. The graphic below illustrates some of the potential barriers that people with bed bug infestations face. Local government leaders should be aware of these barriers when working to help their community deal with bed bugs.

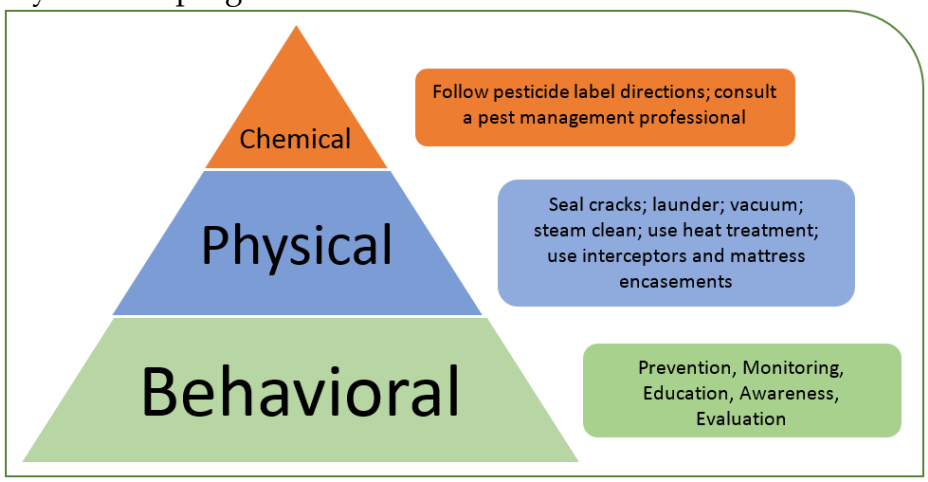
Barriers to effective bed bug control

Tools

To effectively address the bed bug problem, local governments will need to use a collaborative approach that employs a wide range of communication tools, products and services, and policies that promote Integrated Pest Management (IPM).

Integrated Pest Management

Communities may not be able to effectively manage bed bugs without coordinated community involvement using the principles of Integrated Pest Management (IPM). IPM is an effective approach to pest management that relies on a combination of common-sense practices that present the least possible hazard to people, property and the environment. When it comes to bed bugs, local government leaders should provide messages to the public that align with the principles of the IPM pyramid depicted below. As the pyramid depicts, you should first understand the biology and behavior of the pest, be able to identify the signs of bed bugs, and understand how to monitor for bed bugs. After acquiring this knowledge and putting these behavioral practices in place, you may decide that physical methods of control for bed bugs are needed for your situation. If you decide that pesticides are needed for your situation, you should only use pesticides judiciously and only in combination with physical (non-chemical) methods of control. With an infestation, you will probably need to hire a professional; getting an experienced pest management professional involved as soon as possible can help prevent an infestation from spreading. Finally, you should continually monitor and evaluate your IPM program to ensure success.



Components of IPM

An IPM approach is especially critical to control bed bugs in multifamily housing, lodging and institutional facilities. To manage bed bugs at the local level, local government can help coordinate prevention, surveillance, education, and communication activities.

Communication

Effective communication is vital for a complex issue such as bed bugs. This section presents information on what to say, how to say it, and which communication outlets may be best. It includes tools to promote behavior change.

What to say

When working with people who have bed bugs, communication about how to solve the problem can bring up many complex issues. To ensure that key messages are delivered, local bed bug control and management efforts can benefit from creating a message map to guide their communication content.

Local communities should follow the below steps, as outlined in the EPA's Risk Communication guide,[3] when developing messages for various audiences:

Step 1: Identify stakeholders
Step 2: Identify anticipated stakeholder questions and concerns
Step 3: Identify frequent concerns and link them to the stakeholders
Step 4: Develop key messages
Step 5: Develop supporting information
Step 6: Test your messages

The next page provides an example of an overarching message map for the general public on responding to basic bed bug questions. Communities can use this message map to guide communication, though it should be adjusted accordingly to meet the needs of different audiences. EPA's Bed Bug Information Clearinghouse can be used to help create message maps for specific audiences, including first responders, health care facilities, hotels, housing authorities, landlords, pest management professionals, residential, schools/child care centers, shelters, transportation services, and workers entering homes.

[3]United States Environmental Protection Agency (August 2007). *Risk Communication in Action: The Tools of Message Mapping*. EPA/625/R-06/012 Retrieved from http://nepis.epa.gov/Adobe/PDF/60000IOS.pdf

Message Map for the Public **Question: If you think you have bed bugs, what do you need to know?**		
Key Message 1: Identification	Key Message 2: Get Started	Key Message 3: Treatment
Don't panic	Learn more and consider your next steps	Treatments vary depending on your situation
Supporting Information 1.1	Supporting Information 2.1	Supporting Information 3.1
Be certain you really have bed bugs – the only way to be sure is to find and positively identify a bed bug	Integrated pest management is an effective and environmentally-sensitive approach to pest control	Contact a professional if you can who is experienced in treating bed bug infestations and who uses integrated pest management approaches
Supporting Information 1.2	Supporting Information 2.2	Supporting Information 3.2
Bed bugs are not known to spread disease[4]	You can turn to local communities that offer resources related to bed bugs	Some do-it-yourself bed bug control options are available, but be careful
Supporting Information 1.3	Supporting Information 2.3	Supporting Information 3.3
You can't tell if you have bed bugs only from a bite; many people don't react to bed bug bites	Overcoming bed bug infestations will require ongoing effort and attention; there is no magic bullet	Any pesticide can pose risks to people, pets, or the environment; always follow label instructions; more is not better

Sample message map

[4] Bed bugs have been documented as competent vectors of very few disease causing pathogens. Under normal living conditions, bed bugs have not been found to transmit pathogens to humans

How to Communicate

To effectively get the message out and reach people, it will be important to convey information in a digestible manner. EPA's Risk Communication guide[5] summarizes the elements of good and poor communication with the following table:

Good Communication	Poor Communication
Clearly state and estimate the risk **Ex. "We have a serious and immediate problem requiring attention…"**	Exaggerate or minimize the risk Ex: "No one has anything to worry about"; "it's time to panic"
Use clear, non-technical language – write in an eighth-grade reading level if talking to the general public	Use technical language/jargon – for example, filling the speech with acronyms
Use credible sources – government agencies, scientific experts, reliable new sources (AP, Reuters, etc.)	Use non-credible sources – lobbying groups, industries
Listen to the audience – assume that if one communicates in a clear, appropriate manner, the audience will understand	Ignore the audience's concerns – a "they won't understand anyway" mentality
Remain calm – do not get agitated or defensive	Get angry – "That's a stupid question…"
Keep messages brief – main message about 25-30 words (and 10 seconds)	Make messages long-winded – droning on and on with long lists
Balance a negative statement with three positive statements	Use an overload of negative statements, and words like "no," "never," "nothing"
Place most important messages first and last	Hide most important message in the middle of the speech
Use visual aids and graphics – charts, videos, pictures, graphs	Use impersonal statistics – "The chances of one having an exposure of more than 50 ppb is about 1 in 100"
Repeat messages – three times, to make sure the most important points are remembered	Mention an important message in passing – "Oh, by the way, the hurricane warning is effective immediately…"
Speak with a serious tone – it will give the impression of taking the audience seriously	Add humor – can often come off as flippant or be misunderstood as a lack of concern

[5]United States Environmental Protection Agency (August 2007). *Risk Communication in Action: The Tools of Message Mapping*. EPA/625/R-06/012 Retrieved from http://nepis.epa.gov/Adobe/PDF/60000IOS.pdf

Promoting Behavior Change

Many of the actions needed to effectively manage bed bugs require behavior changes from those individuals affected. Two concepts that are useful for changing behaviors are:

- Refuting Incorrect Information
- Social Marketing

Refuting incorrect information can be difficult and can often backfire if done incorrectly. Given the current lack of social awareness regarding bed bugs, several myths have pervaded the general public's perceptions and beliefs about the pest and treatments. The Debunking Handbook[6] is one resource that provides tactics for correcting misinformation. The following tactics can be applied to bed bug communication efforts:

- **Core Facts:** a refutation should emphasize the facts, not the myth. Present only the key facts

  The below **facts** counter common myths about bed bugs:
  - You should be able to see bed bugs with your naked eye
  - Bed bugs are an issue across the country
  - Bed bugs can be found anywhere, even the most expensive hotel; they are not a sign of poor cleaning
  - Bed bugs are not known to spread disease
  - Bed bugs are a public health pest
  - Bed bugs cannot be identified by their bites alone
  - Bed bugs do not fly or jump
  - Bed bugs do not live on your body like lice

- **Explicit Warnings**: before mentioning a myth, warn the reader that the upcoming information is false

- **Alternative Explanation**: if you are debunking a myth, you need to provide an alternative explanation

- **Graphics**: core facts should be displayed graphically or visually if possible

[6] Cook, J., & Lewandowsky, S. (January 2012). *The Debunking Handbook*. Retrieved from http://www.skepticalscience.com/docs/Debunking_Handbook.pdf

The box below presents an example of how to effectively refute a myth.

Bed bugs cannot be identified by bites alone. Human skin reacts to many environmental conditions with a reaction that appears to look like an insect bite. Many different types of insects will bite people and bites from different insects may look similar. Also, people react to bed bug bites in different ways, ranging from no reactions at all to severe allergic reactions.

Examples of Bed Bug Bites

Photo Credit: Tim Stock, Oregon State University

Photo Credit: Harold Harlan, Armed Forces Pest Management Board

Photo Credit: Harold Harlan, Armed Forces Pest Management Board

Photo Credit: Dini Miller, Virginia Tech Bed Bug and Urban Pest Information Center

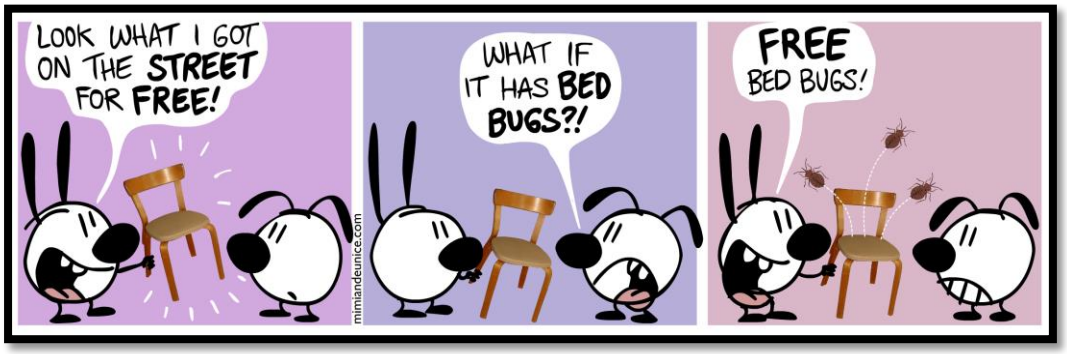
Social marketing is a tool designed to influence the behavior of a target audience for the benefit of individuals or society as a whole. The key to successful social marketing is to develop a marketing strategy that addresses a very specific behavior change you would like to achieve.

Social Marketing Services provides one example of a process for developing a social marketing campaign in the public sector:[7]

1. Describe the Background, Purpose and Focus for the Planning Effort
2. Conduct a Situation Analysis
3. Select and Describe the Target Audience
4. Set Marketing Objectives and Goals (Behavior, Knowledge, Beliefs)
5. Identify Audience Barriers, Benefits and the Competition
6. Craft a Desired Positioning Statement
7. Develop a Strategic Marketing Mix (The 4Ps): Product, Price, Place, and Promotion
8. Determine an Evaluation Plan
9. Establish a Campaign Budget and Find Funding
10. Outline an Implementation Plan

Local governments could develop social marketing campaigns to influence behaviors such as:

- Inspecting second hand furniture before bringing it home
- Safely using pesticides or other treatments in the home
- Properly disposing of infested items; For example, in some cities, residents are discouraged from dumping infested furniture or incentivized to call their property manager to dispose of items properly



CC-BY-SA Nina Paley

[7] Lee, N. & Kotler, P. (2015). *Social Marketing: Changing Public Behaviors for Good.* SAGE Publications.

Communication Outlets

When planning your communication strategy, consider the following advantages and disadvantages of different communication outlets.

Communication Outlet	Communication Activities	Advantages	Disadvantages
Newspapers	Paid ads, inserted sections, news coverage, opinion/ education pieces, letters-to-the-editor	• Broad audiences • Allow readers to clip, reread and share pieces • Can allow for detailed information • Rapid distribution	• Obtaining coverage can be difficult • Advertising and inserts can be expensive • Small audiences
Radio	Scripted ads, pre-recorded ads, news coverage, participation on talk shows, scripted programming	• Ability to target intended audiences • Inexpensive • Familiarity with source of information (pre-recorded ads) • Can allow for two-way discussions (call-in shows)	• Small audiences • Difficult for listeners to retain material accurately • Format limitations (many stations do not have appropriate forums for sharing health-related information)
Television	Paid ads, news coverage, participation on talk shows, scripted programming	• Ability to target intended audiences • Large audiences	• Expensive • Sharply declining viewership among those under 55-years-old
Social Media	Facebook posts, YouTube Videos, Twitter	• Caters to short attention spans • Allow for snowballing distribution • Ability to reach younger audiences • Inexpensive (Facebook and Twitter)	• Messages must be extremely simplified • Time consuming and potentially expensive to produce (YouTube)
Organization/ Community	Town hall meetings, focus groups and workshops, organizational meetings	• Large target audiences • Ability to provide motivation and support • Allow for two-way discussions	• Time consuming and expensive
Interpersonal	Hotlines, trainings, informal discussions, public posters or signs	• Allow for two-way discussions and engagement • Most effective for teaching and providing direct assistance	• Expensive and time consuming • Limited audiences

Products and Services

To improve the effectiveness of a community response to bed bugs, local government should employ a range of products and services that can be used to engage, inform and learn from residents, landlords, property manager and local organizations. The following list should be used as a starting point rather than a set of all-encompassing products and services.

Workshops

Workshops allow local governments to share information, educate and collaborate with stakeholders.

Bed Bug Workshops in King County, Washington

The Local Hazardous Waste Management Program in King County informally took responsibility for residential pesticide use issues in 2000 and bed bugs in 2009. With 1.9 million people and some 170 different languages spoken in the county, the cultural and language diversity presented a number of obstacles for their educational outreach programs. Two examples, many groups do not trust government or would not think to share their problems with professionals or government officials, and the level of illiteracy among immigrants and refugees were significant.

With such a diverse population, building trust within specific groups in the community is extremely important. King County Hazardous Waste has sought to develop relationships with local community organizations to do so. After initially working with the county, local non-profits have started to reach out to the Hazardous Waste Program to conduct trainings and workshops. Non-profits organize events, including all logistics and advertisement, and King County sends guest presenters. Through these partnerships the county is able to expand its capacity and reach a wider audience.

King County offers education workshops and peer-to-peer trainings. For a general bed bug education workshop, a King County staff member gives a 45-minute presentation and distributes informational materials, which are translated into 16 different languages. They also offer a 'goodie-bag' with bed bug interceptor cups, flashlight and bed encasements to all attendees. In 2014, two staff members conducted over 100 indoor hazards workshops, of which 42 were specific to bed bugs.

Summits

Summits are an example of a large community workshop. They could be held occasionally for a large audience and can be open to anyone interested in bed bugs.

Central Ohio Bed Bug Task Force (COBBTF) Annual Summit

In 2008, a core group of people organized a general bed bug summit, which helped to create the COBBTF. As a part of its ongoing effort to educate residents in Central Ohio on bed bug prevention and the best methods of getting rid of the pest, the COBBTF continues to organize an annual daylong summit that is free and open to the public. You can see online their 2014 general agenda and slides from the Summit.

Town Hall Meetings

Town hall meetings provide community members with an opportunity to voice their opinions and concerns.

Ohio Town Hall Meetings

In Cincinnati, Ohio State Representative Dale Mallory sponsored a series of Town Hall meetings in August 2007 to hear the community's concern about bed bug infestations.

Following those Town Hall meetings, Representative Mallory convened an emergency meeting of city, county and state officials in January of 2008 to discuss solutions to the bed bug problem in Cincinnati and Hamilton County. As a result of that meeting, the Joint Health Department Bed Bug Task Force was formed.[8]

Local Government Website

A bed bug page on a local government website can:

- Help ensure that individuals searching for site-specific information online are directed to effective prevention, identification, and management techniques.
- Aggregate contact information for existing government agencies and non-profit organizations that might be of assistance to residents, landlords, or property managers.

Cincinnati, Chicago and Toronto all have well-designed bed bug pages that can be used as a template for other local governments.

[8] The Joint Bed Bug Task Force (June 2008). *The Joint Bed Bug Task Force Strategic Plan*. Retrieved from http://newyorkvsbedbugs.org/wp-content/uploads/2008/10/joint-bed-bug-task-force-strategic-plan-final-june6.pdf

Trainings

Trainings help local governments increase the quality of prevention, identification and treatment by informing relevant stakeholders of the best practices. Effective trainings should be targeted, providing only information relevant to the audience at hand.

Key stakeholders to consider inviting to trainings include:

- Individual residents and landlords
- Multi-family housing complexes
- Pest management companies
- Community organizations
- Hotels, local shelters and schools

Texas Agrilife Extension Service Shelter Trainings

As a part of an EPA-funded grant, the Texas Agrilife Extension Service developed and implemented four half-day educational programs for local shelter management and staff in Texas cities. In total, they trained 94 shelter managers and staff. Dr. Michael Merchant, a Professor and Urban Entomologist at Texas Agrilife, developed slide show presentations providing the most important information for shelters. He also developed hands-on mattress inspection displays and hand sanitizer vials for use at these trainings.

Pre- and post-training questionnaires showed that attendees' understanding of concepts such as, biology and behavior of bed bugs, barriers for bed bug control, and importance of a monitoring program, improved substantially.

Partnering with Community Organizations for Trainings in Chicago

The Midwest Pesticide Action Center began bed bug education trainings in 2010, originally on a fee-for-service basis. In 2012, the City of Chicago began to provide funding for their educational efforts. Though the funding they receive is for all pests, most of their work has been focused on bed bugs.

As a non-profit, MPAC has a level of flexibility and nimbleness not afforded to local governments. In 2014, MPAC completed 27 training events, most of which were free for attendees. These events put them in front of a myriad of audiences from landlords and building managers to tenants and condo owners. For most of the trainings, MPAC partners with other non-profits, agencies or aldermanic offices. MPAC is able to offer these services at lower cost than the city would be able to offer. By partnering with a non-profit that is on the ground and directly in touch with vulnerable populations, the City of Chicago is better able to serve its population.

Peer-to-Peer Trainings

The US Environmental Protection Agency (EPA) has published presentations designed for homeowners and multi-unit facilities to train others in their network. Purdue University has also compiled a set of tools specifically for "those charged with educating others about bed bugs." These peer-to-peer training tools include PowerPoint presentations, brochures, short videos, photographs, answers to commonly asked questions and an interactive video game designed to teach younger audiences about inspections.

King County Peer-to-Peer Training Programs

In King County, the Local Hazardous Waste Management Program conducts six- to eight-hour trainings to staff and volunteers from other organizations. Trainings include a PowerPoint presentation and specific instructions on sharing culturally appropriate messages about bed bugs for individual organizations. Attendees of the training are then able to use the knowledge and materials to train other members in their community about bed bugs. Due to its relationship with community organizations, King County is often invited to do trainings for various community groups.

Graphic Novels

Graphic novels provide a channel to present a large amount of widely varied information in an easy-to-understand format. Graphic novels present information in a story format, educating readers about a difficult issue in an engaging and even enjoyable format.

Gateway Bed Bug Training and Technology Project

The EPA funded a Public Policy Research Center and University of Missouri-St. Louis project creating "accessible resource materials for low-income, minority and immigrant households that have been or are at risk for being impacted by the bed bugs epidemic." To achieve this goal, the group developed a graphic novel using simple language, clear imagery and a relatable storyline to inform readers about the most important topics related to bed bug prevention, identification, and treatment. Community groups distributed paper copies of the graphic novel to residents struggling with bed bugs. Copies were also distributed at various public meetings, where they were in high demand.

Brochures and Videos

These resources can be distributed directly to residents, provided to community organizations for distribution and published online. Brochures and videos are useful for providing a basic overview of relevant information and directing individuals to more detailed resources. The EPA has a number of ready-made brochures and videos available. Some resources are available for low literacy tenants or different languages.

Posters

Posters can be placed in public spaces and distributed to local organizations to disseminate information and combat myths about bed bugs. Posters can be especially useful for increasing awareness among community members that have yet to be impacted by bed bugs. Rutgers and the Midwest Pesticide Action Center have produced posters for the general public.

Source: Marcia Anderson & Chang Lu, Rutgers

Hotlines

Local governments can use hotlines to provide residents with:

- A go-to source of information about landlord-tenant responsibilities
- Information about effective prevention, identification, and treatment techniques
- A directory of certified pest management companies
- Offer translation services for non-English speakers

Cornell University developed a "How to Talk to Callers about Bed Bugs" guide that recommends methods for steering conversations to first identify the nature of the situation, then determine the level of knowledge the caller possesses, and finally to inform and advise callers to meet their individual needs.

Portland, Oregon, and Multnomah County Hotline: 988-Bugs

A phone tree menu directs callers to different staffers based on area of need:

- Registering complaints about hotels and businesses
- Identifying bed bugs
- Providing renter or homeowner-specific information and answers to questions
- Shared staffing for the hotline requires minimal time from individual agencies such as public health, building inspections and code compliance.

Policy Considerations

Policy changes present opportunities and challenges as part of a comprehensive bed bug management program. Policies and regulations, at all levels of jurisdiction—city, county, or state, or even internal operating procedures—have potential to significantly impact how individuals and organizations deal with bed bugs. A first step for local government leaders is to evaluate whether their codes promote behaviors that encourage proactive bed bug management.

Rental Housing: Landlord or Tenant Responsibility?

Whether a landlord or tenant is responsible for bed bug treatment is among the most common bed bug-related questions across the country. In most situations, pest control is considered to be the responsibility of the landlord. Many places have exemptions to this rule in cases where the tenant is responsible for introducing the pest into the building.

In the case of bed bugs, it is difficult to know the cause and source of the infestation. Bed bugs may be present in a unit or building because previous infestations were not fully eradicated or the pest was re-introduced after successful treatment. Bed bugs are a community issue, and the landlord/tenant divide could lead to an increase in pest pressure in a building.

It is important that any bed bug ordinance for rental properties should **specify the roles and responsibilities of all parties**: landlords, tenants and pest control operators. The below boxes present an example of the types of specifications that could be developed by local governments. These were developed by the Contra Costa County Bed Bug Task Force.[9]

The landlord must openly discuss bed bugs with tenants to educate them about prevention and to encourage immediate notification of a problem. Bed bugs are much easier to manage in the early stages of an infestation.

The pest control company must communicate effectively with all parties; inspect units above, below and on both sides of the affected apartment, as well as common areas of the building; and provide a thorough treatment with follow up.

Tenants must notify the landlord or manager immediately if they suspect a bed bug infestation. They must learn how to prevent and avoid infestations, and they must do their part in the treatment process.

[9] Drlik, T. (2012). *Bed Bugs and the Law in California*. Retrieved from http://cchealth.org/bedbugs/pdf/Bed-Bugs-Law-California.pdf

Roles and Responsibilities Examples

The City and County of San Francisco has an extensive definition of roles and responsibilities for each party. Because of the complexity of many ordinances, **education** on roles, rights and responsibilities is essential.

The Metropolitan Tenants Organization developed a handout to inform tenants and landlords of their responsibilities, and the Midwest Pesticide Action Center created a factsheet to educate landlords and tenants on their responsibilities.

Local governments also need to consider several **challenges and implications** when passing ordinances and educating parties about their roles. Without a well-articulated bed bug ordinance, tenants are left to cope on their own and will struggle to control infestations. Pest pressure will build, and bed bugs could spread to the greater community. Even with a bed bug ordinance, challenges can arise from each party, as depicted below.

Party	Potential Challenges
Landlord	• Non-compliance: will not treat a unit or assist residents needing help to control bed bugs. • Not educating the tenants on prevention and early notification. • Selecting a pest control operator based solely on price, rather than on experience with bed bugs and IPM programs. • Recouping treatment costs by billing the tenant • Does not re-inspect units after infestation
Tenant	• Non-compliance: does not report an infestation • Afraid of eviction, personal property loss, and unaware of rights • Unable to prepare for treatment • Unwilling to let an inspector or pest control operator into the home • Attempts at DIY pest control could lead to ineffective treatment and pose human health hazards • Clutter and lack of cooperation with pest management professional
Pest Control Operator	• Does not employ Integrated Pest Management strategies • Does not effectively treat unit

Left unaddressed, each of these challenges may result in the spread of bed bug infestations.

Local government should consider the following questions to ensure an equitable and successful bed bug ordinance:

- Does the ordinance promote behavior consistent with IPM goals for bed bug management?
- Does the ordinance assign clear roles and responsibilities for both landlords and tenants?
- How is the financial responsibility assigned? Who pays for treatment?
- Are resources available to help vulnerable populations?
- Does your local government have the staff and capacity to fully implement a bed bug ordinance?

The Chicago Bed Bug Ordinance

In Chicago, the Midwest Pesticide Action Center (MPAC) was instrumental in getting an ordinance passed. The organization began receiving calls about bed bugs in 2009 and started researching the issue. They realized that bed bugs and the treatments people use could be a substantial problem and thus pushed for a solution. In 2011, they wrote a white paper to the City of Chicago, *Battling Bed Bugs in Chicago: Making the Case for a Comprehensive Plan*. Among the recommendations made to the city, they suggested that the city code and ordinances be updated to reflect the reality of bed bugs.

In December 2013, Chicago enacted an ordinance to define who is responsible for bed bug control in multi-unit buildings. The ordinance specifies that tenants must report a suspected bed bug problem within five days and landlords are responsible for hiring a pest control operator/professional. According to an MPAC factsheet, the specific landlord responsibilities are to educate, inform, inspect, treat, and:
*Attach a bed bug informational brochure to all new and renewing leases.
* Respond to any known or suspected bed bug infestation within ten days.
* Provide inspection and treatment services by a pest management professional.
* Inspection and, if necessary, treatment must be done in units adjacent to, above and below the unit suspected of infestation. This pattern is continued in the building until no evidence of bed bugs is found.

The ordinance also specifies duties for tenants and condominiums. The ordinance is jointly enforced by the Department of Buildings and the Chicago Department of Public Health.

Other Policy Options

Bug Bomb / Fogger Regulations or Restrictions

Some common issues related to the use of bug bombs and foggers merit attention. Research has shown that when used alone, these devices are not effective in eradicating bed bug infestations because they do not reach the cracks and crevices where bed bugs hide.[10] In response, people often resort to using more than the recommended number of the bombs in their homes, which can create a risk for human injuries and illnesses. Additionally, the belief that this instrument can be used alone to combat an infestation can exacerbate the problem by delaying effective treatment. In multi-resident housing, using these products can lead to bed bugs traveling to other apartments and exacerbating the problem.

Local governments can establish programs to mitigate the harm associated with misusing these devices. Potential options include providing retail stores with consumer information about Integrated Pest Management in the form of brochures, clearly visible fact sheets or posters, or other outreach efforts focused on encouraging people to use the devices, and all pesticides, according to the label instructions.

Due to the prevalence of misuse, some governments have decided to discourage local residents from using the devices entirely, such as in King County. Another approach was taken by the NYC Health Department and the NY State Department of Environmental Conservation in New York, whereby they restricted the use of the devices to professional pesticide applicators.

Report incidences of individuals incorrectly using foggers or other pesticides to the appropriate state lead agency for pesticides. Incidents occurring on tribal land should be reported to the appropriate regional EPA office.

Mandatory Incident Reporting

By requiring residents to report any incident of bed bugs, local governments can track the prevalence of infestations in and around a community. This also allows officials to direct limited resources to the places they are needed most. By publicizing incident data, a local government can raise awareness of bed bugs and create incentives among those impacted to better address the problem.

In New York City, landlords must provide tenants moving into new residential units

[10] Jones, S. & Bryant, J. (2012). Ineffectiveness of Over-the-Counter Total Release Foggers Against the Bed Bug (Heteroptera:Cimicidae). *Journal of Economic Entomology*. 105(3): 957-963.

with a one-year bed bug history report. This report is an example of incident reporting and disclosure.

Challenges
Data derived from current on-line bed bug reporting tools, likely contain data quality issues. Incidents reported by anonymous members of the public may not be of actual bed bugs. Users may take advantage of negative social stigma of bed bugs to give an unfavorable hotel bad publicity. Or, a bed bug incident may have been a one-time problem that has since been solved. The negative social stigma of bed bugs also prevents the hospitality industry from advertising its bed bug incidents or management policies, further exacerbating the problem. Similarly, housing providers may push back on reporting requirements, fearing declining occupancy rates as a result.

311 Incident Reporting

In Chicago, people can report instances of bed bugs by dialing 311 or filing a complaint online with the Department of Buildings. The Midwest Pesticide Action Center developed an informational graphic to educate people about this option.

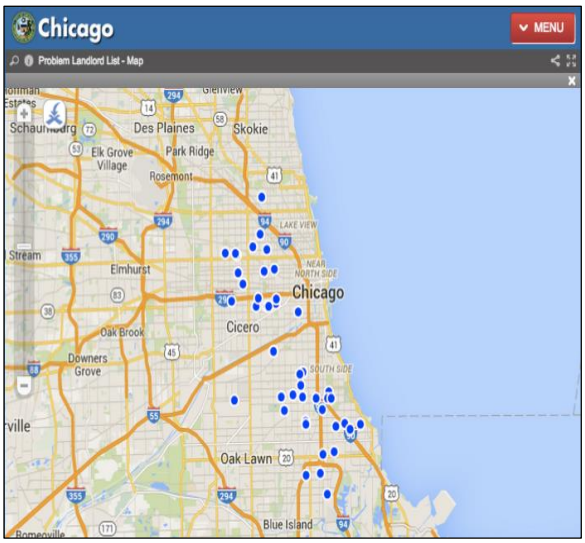
Encouraging Compliance from Landlords/Punitive Approaches

Local governments can persuade landlords to take part in proactive and effective prevention, inspection, and treatment steps through programs such as:

- Publishing information on infestations in rental properties, possibly through *Mandatory Incident Reporting* or *Hotlines*.
- Establishing a system of fines or penalties for those landlords failing to meet obligations

Chicago's "Problem Building Owners"

The city of Chicago uses a system which combines techniques of naming and shaming and fines and penalties to encourage residential building owners to provide tenants with legally granted services and protections. The city tracks data on landlords who repeatedly fail to provide these services and protections, and publishes the information online where the general public can access it. Landlords on the list are also subject to fines and penalties including revoked access to property zoning changes and suspended eligibility to financial assistance through city programs.



Encouraging Community Engagement

Community members should learn about bed bugs before they deal with an infestation. Incentive programs can be used to pre-emptively engage residents on the topic.

- Local government could encourage widespread engagement while simultaneously developing effective localized materials by funding a contest within a community. For example, schools and other partners could conduct contests asking for videos or posters with key messages about bed bugs.

Requiring Bed Bug Management Certifications

Ineffective treatments tend to exacerbate the problem, as people believe that the problem has been resolved. The resulting lack of attention leads to infestations that grow and spread. Paying for ineffective treatment can also be extremely frustrating for those dealing with infestations, which can reinforce feelings of helplessness.
A potential policy option to address these concerns is to require or establish a voluntary program for pest management companies to earn certifications in IPM techniques to become eligible to treat bed bug infestations. Washington State University Extension School has partnered with a pest management company to offer voluntary pest management company certifications that could be used as a template for this type of program. IPM Institute of North America's Green Shield program and National Pest Management Association's Green Pro program are examples of programs that certify PMPs with verifiable IPM skills. Training for housing code enforcement officers is also an option.

Developing Unified Policies

To resolve inconsistencies across jurisdictional lines, government can implement unified policies to clearly define roles and streamline bed bug management practices throughout a region. Though this is difficult to implement at a local level, advocacy efforts could prompt action at a state or federal level.

Australia Bed Bug Policy

In Australia, a Working Party (WP) was established to find the best practices in pest management through research and to develop a Code of Practice for the Control of Bed Bug Infestations. The "Code" covers many aspects of bed bug management, including education and training, occupational health and safety, selecting a good pest manager, bed bug identification, preparing for inspections and treatments, the process of inspections and treatments, and situational control.

Get Organized

Local government employees hear first-hand about bed bugs in the community and can play a central role in organizing the effort, communicating to the public, and identifying resources and partners. As a result, local governments are uniquely positioned to lead the effort against bed bugs on a community-wide level.

Determine your Goals

Bed bug related concerns can surface through the work of many areas of public service, such as:

- Public Health
- Housing
- Code Enforcement
- Social Services
- Toxics and/or Pesticides
- Elected Officials (or a representative)

As a first step, aim to gather a core group of people with representatives from the different departments.

Once you have identified your core group of government actors, organize meetings with your peers. Your objectives should include:

- **Define and identify the problem**
  - Who is affected the most?
  - What factors contribute to the problem?

- **Identify your capacity to tackle the problem**
  - How much time do you have?
  - What are your available resources? Are you able to devote a staff member to the cause?
  - Is there someone who can lead the group?

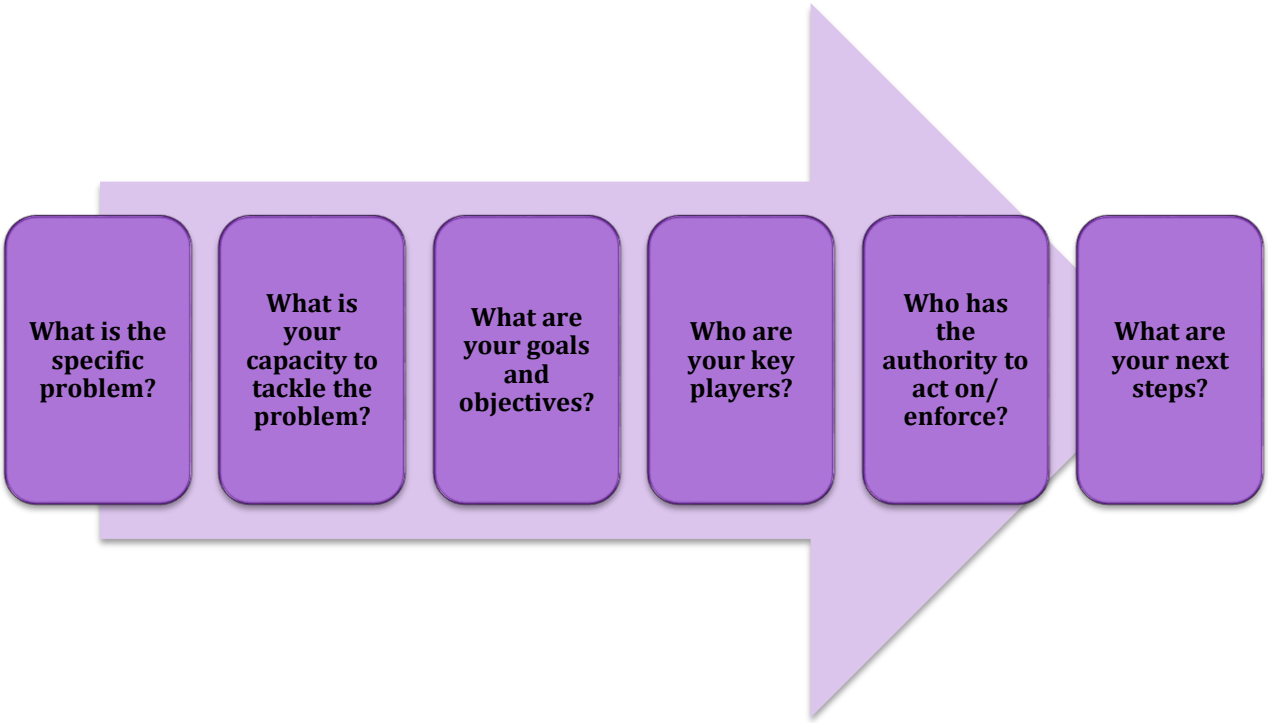
- **Define your goals and objectives**
  - A specific goal will ensure that the group prioritizes. For example, do you want to try to reduce infestations, help those who cannot afford treatment, limit the number of phone calls you are receiving, or try to get bed bug treatment costs down?

Determine your Goals

- **Identify key players**
  - What community partners and non-profits are involved in existing bed bug efforts?
  - Who are the scientific and technical experts available to consult on bed bug biology, behavior and effective treatments?

- **Determine which, if any, agency has the responsibility and authority to act on and enforce bed bug issues**

- **What are your next steps?**



Define your Next Steps

The next steps in your community will vary depending on your location's specific circumstances. Below are examples of what other communities have done.

The Central Ohio Bed Bug Task Force

The COBBTF is a voluntary organization aimed at educating residents. In 2008, the group created a strategic plan outlining the bed bug issues in its area and established different working groups that would tackle specific issues:
* Hotline/Customer service response
* Educational brochures and scripts
* Training
* Legal and enforcement issues
* Research
* Inspection Issues
* Evaluation

From 2008 to 2014, the task force met monthly. Meetings were open to anyone interested in learning or disseminating educational information on bed bugs. Today, the task force is run by a steering committee and has over 50 partners.

King County, Washington

In King County, the Local Hazardous Waste Management Program is the informal lead for bed bug issues. The Public Health Department of Seattle and King County provides information on its website, but they refer to the King County Household Hazards Line as the contact resource. The hotline is staffed by a Hazardous Waste Management Program employee who offers callers tips on best practices and directs them to additional resources such as the Michigan Guide to Controlling Bed Bugs.

Toronto, Canada

Toronto created the Toronto Bed Bug Project (TBBP) in early 2008, which took on several projects including bed bug treatment pilot projects. After the projects, the city realized that treatment alone would not get rid of bed bugs and moved to a more integrated approach.

Currently, the city employs public health officials who are responsible for environmental safety, and nurses who are responsible for the patients (people suffering from bed bugs). The city has funds available to help people with treatment preparation, a service that is vital to people who do not have a social support network or who are unable to attend to preparation because of a physical disability, mental health issue, or advanced age.

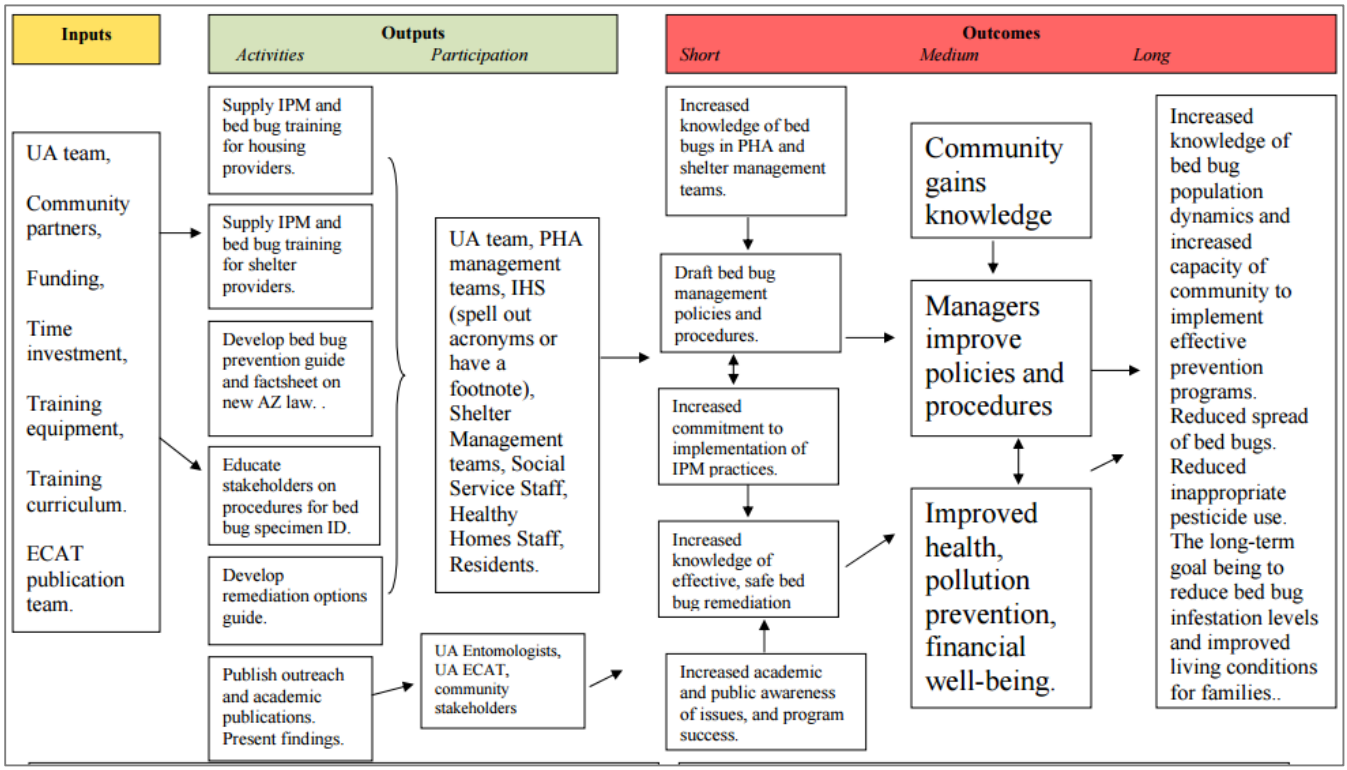
Evaluate Your Efforts

A well-conceived evaluation program will help you assess whether efforts made by local government to tackle bed bugs are achieving their desired outcomes. Outcomes should be assessed and measured by indicators. These indicators will inform you how to continually adjust efforts to achieve better results.

Logic Models and Indicators

A logic model is a visual depiction of a program and its intended effects that lays out a project's resources, activities, outputs and outcomes. Developing a logic model can help determine what indicators you will evaluate in order to assess your program or project. University of Kansas' Community Toolbox provides information on logic models and evaluation.

Your logic model and your desired outcomes will ultimately determine what you measure and evaluate. The following logic model from a University of Arizona proposal for a community bed bug education project provides a useful example of a logic model for a facility management audience. Additional models could be developed to support pest management professional and resident needs.



Sample Logic Model (Source: University of Arizona), Acronyms: UA = University of Arizona; PHA= Public Housing Authority; ECAT = UA's Educational Communications & Technologies

Though measurement indicators will be project specific, the following table illustrates potential outcomes and corresponding indicators that can help measure progress toward successful bed bug management.

Desired Outcome	Potential Indicator
Reduced incidents of bed bugs	• Reduction in number of incidents • Elapsed time from detection to treatment • Number of repeat infestations

Increased knowledge and awareness from the public
------ 	
Increased engagement from stakeholders
------ 	
Increased number of people who have their needs met
------ 	
Increased use of IPM
	• **Indicators to measure communication efforts**
	  • Number of additional contacts
	  • Amount and types of media coverage
	  • One example for evaluating communication efforts can be found in this Lumina Foundation's document
	
	• **Indicators to assess products and services**
	  • Number offered
	  • Number of participants
	  • Coverage and participation rates
	  • Number of requests for products and services
	  • Number of new ones offered or created
	  • Participant satisfaction
	
	• **Indicators to evaluate policy considerations**
	  • Number of complaints
	  • Number of violations
	  • Number of new policies or programs
	  • Survey data on landlord perceptions
	  • Survey data on tenant perceptions
	  • Survey data on community satisfaction

Increased attention and resources dedicated to bed bug issues	• Number of staff • Amount of dedicated funds (Note: a short-term increase in resources and funds devoted to bed bug issues could result in a long-term reduction in costs)

Outcomes and indicators to measure success

An Evaluation of the Chicago Bed Bug Ordinance

The Midwest Pesticide Action Center evaluated the Chicago Bed Bug Ordinance in 2014 through city data on violations, an online survey, and a roundtable meeting.

MPAC's analysis showed that there were 138 formal building violation complaints relating to bed bugs in 2014. Each of the violations was followed up with an inspection and, of the 138 cases, 104 were initiated because of a complaint and the remaining 34 resulted from a periodic inspection. Violations were issued on 129 of the 138 inspections (93.4% violation rate).

MPAC developed and distributed an online survey to collect data on bed bug infestations and violations. Their results indicated a disconnect between landlords and tenants in their perception of compliance. Their survey revealed that 88% of tenants (n=22) believed landlords had not fully complied and 67% of landlords (n=28) indicated noncompliance by the tenant. Testimonies from building managers at the roundtable meeting revealed that some landlords believed the city did not enforce the ordinance evenly and that reported tenant violations were not investigated.

The collective efforts at evaluating and tracking the ordinance revealed a mixed public opinion of the ordinance itself, as well as substantial confusion surrounding its rules and applications. MPAC communicated these results to the city departments to help them work through any inspection and enforcement issues.[11]

Texas Agrilife Extension Shelter Trainings Evaluation System

To evaluate the effectiveness of its training program for shelters, Texas Agrilife Extension used a retrospective evaluation instrument, requiring pre-training and post-training survey of attendees. These surveys were designed to evaluate attendees' perceived understanding of important concepts related to bed bugs before entering the training and after completing the training.

This system allows Texas Agrilife to quantify the perceived level of understanding of different elements of the problem, measure the effect of the training on those perceived levels of understanding, and target areas of the program for expansion or improvement.

The survey also asked attendees to use a 1-5 scale to rate the value of the training, and a yes-or-no question about whether they expected the training would benefit their shelters economically.

[11] Midwest Pesticide Action Center, personal communication, May 2015

Challenges

Bed bugs are a tenacious and persistent pest that are difficult for individuals to get rid of due to a variety of factors discussed in this starter guide. Organizing a community-level response presents additional challenges. A member of the Michigan Bed Bug Workgroup shared the following challenges and potential solutions.

Challenge: Limited resources and the need for financial support

Potential Solution: Community members should engage their political system and legislators so that they are aware of the problem and can prioritize funding for bed bug efforts. It may be necessary to provide examples of specific bed bug issues in their district, and the potential impacts on families or the economy.

Challenge: Coordination and collaboration are difficult

- Many sectors of the economy are affected by bed bugs
- Many different agencies have the potential to be involved
- Reaching *everyone* is hard
- You can give people basic information, but they are often looking for specific information for their particular situation, i.e., schools, shelters, multi-family housing

Potential Solution: Build strong relationships with other organizations and bed bug groups to share resources and reach a larger breadth of the population

Challenge: A lack of knowledge among professionals involved in the effort

- For example, code compliance officers and other department officials responsible for enforcing housing codes are not often trained in bed bug pest identification or best practices for control
- Not everyone knows about and understands Integrated Pest Management

Potential Solution: Engage local actors and provide information on the correct way to handle an infestation. Share best practices and address 'Band-Aid' solutions that will not solve the problem

Challenge: A lack of ownership. Local governments and other agencies will often claim that bed bugs do not fall within their jurisdiction

Potential Solution: Identify local, on-the-ground leaders who are involved in bed bugs and can pull together the various players

Additional Resources

While bed bug information available on the web is extensive, below are specific resources that provide the public with knowledge and tools to help them tackle bed bugs in their communities.

National Pesticide Information Center (NPIC) Bed Bug website

- Contains information categorized into the following sections:
  - Where to start with bed bugs
  - Bed bug biology and behavior
  - Bed bug control methods
  - Preventing bed bug infestations
  - Don't let pesticides make your problem worse
  - Integrated Pest Management
- Contains links to videos, toolkits, fact sheets and brochures for easy to read, accessible information

EPA Bed Bug Information Clearinghouse

- Contains information aimed at helping communities prevent and control bed bug infestations
- Content is searchable by:
  - Audience
  - Topic
  - Type of Resource
  - Publications of general interest
  - Publications in other languages

Other Places to Look for Information

- StopPests.org
- Pestworld.org
- Your local cooperative extension service

Resources for Organizing

- Central Ohio Bed Bug Task Force Strategic Plan
- Woodgreen Community Services Information Guide
- University of Kansas' Community Tool Box

Contacts

- For questions on pesticide misuse, certification for pesticide applicators, bed bug sniffing dogs or heat treatments, contact the appropriate state pesticide lead agency
- For pesticide issues on tribal land, contact the appropriate EPA regional office