

# Life Quality Impacts of Bed Bug (*Cimex lectularius* L.) Infestations

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NORTHWEST CENTER FOR  
ALTERNATIVES TO PESTICIDES

- Bed bug cases dramatically increased in AZ in 2007
- Over-use and abuse of retail pesticides and other chemicals increasingly evident
- 2007-2011 preliminary data compiled
- Bed bug impact survey developed



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In 2014, we launched an on-line survey (funded by USDA-NIFA) to methodically determine bed bug impacts and analyze the behavioral risk factors associated with bed bug infestations

- Bed Bug survey in English:

<http://www.surveymonkey.com/s/DGLQS52>

- Bed Bug survey in Spanish:

<https://es.surveymonkey.com/s/F5NZXJK>



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### University of Arizona Bed Bug Survey

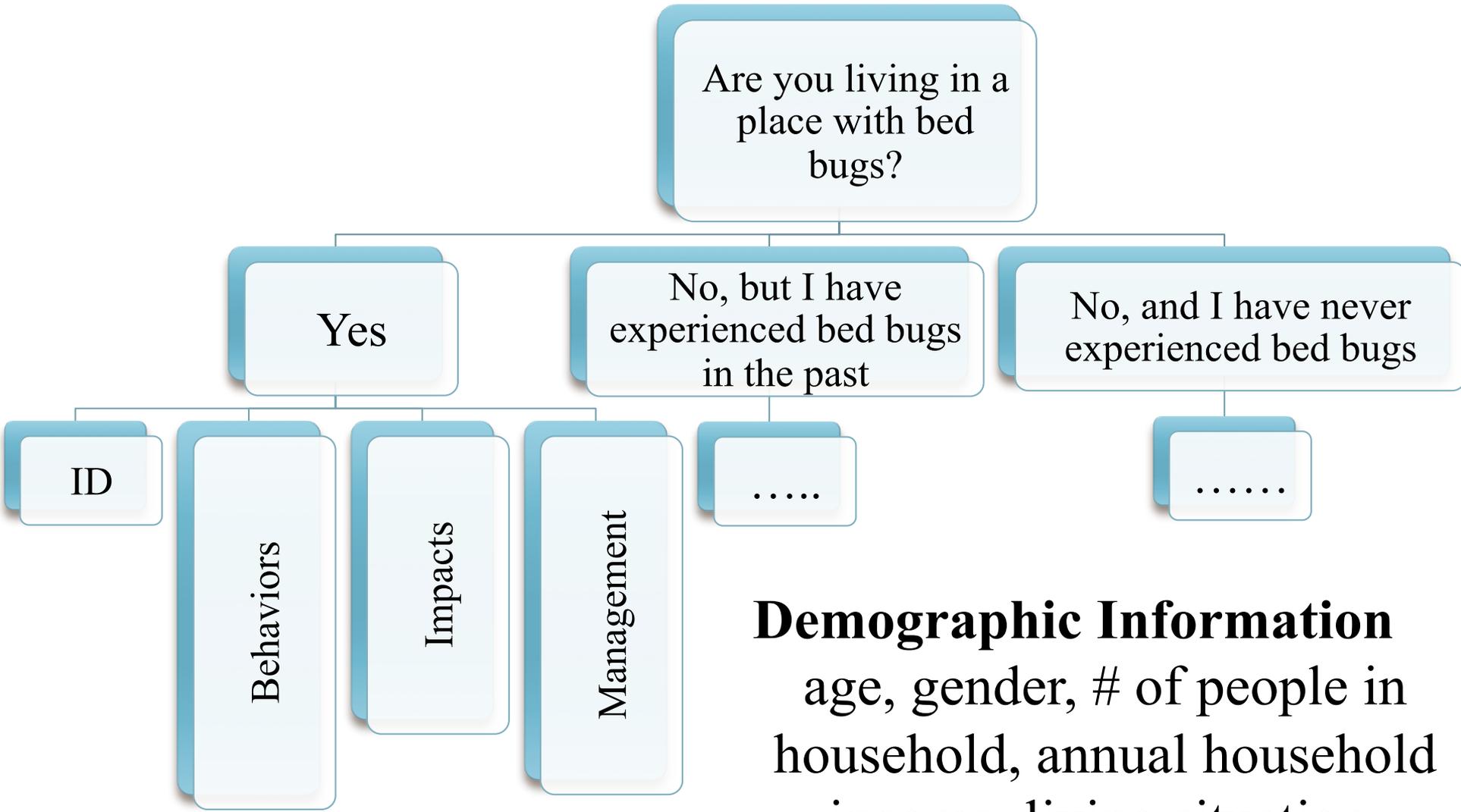
The bed bug epidemic is a national problem. From coast to coast, communities are doing their best to figure out how to beat back bed bugs. Figuring out the best solution, however, is dependent on understanding the problem and the people it affects. That's why Midwest Pesticide Action Center has partnered up with the University of Arizona to investigate the bed bug problem nation-wide.

Please take some time to fill out [the University of Arizona Bed Bug Survey](#) (for the Spanish version, [click here](#)). This survey will be important in establishing a baseline understanding of bed bug infestations—most notably, what factors contribute to such infestations.

As of December 2014, 289 respondents have contributed toward the fight against bed bugs by filling out this survey. Lets keep up the good work!



# Survey Design

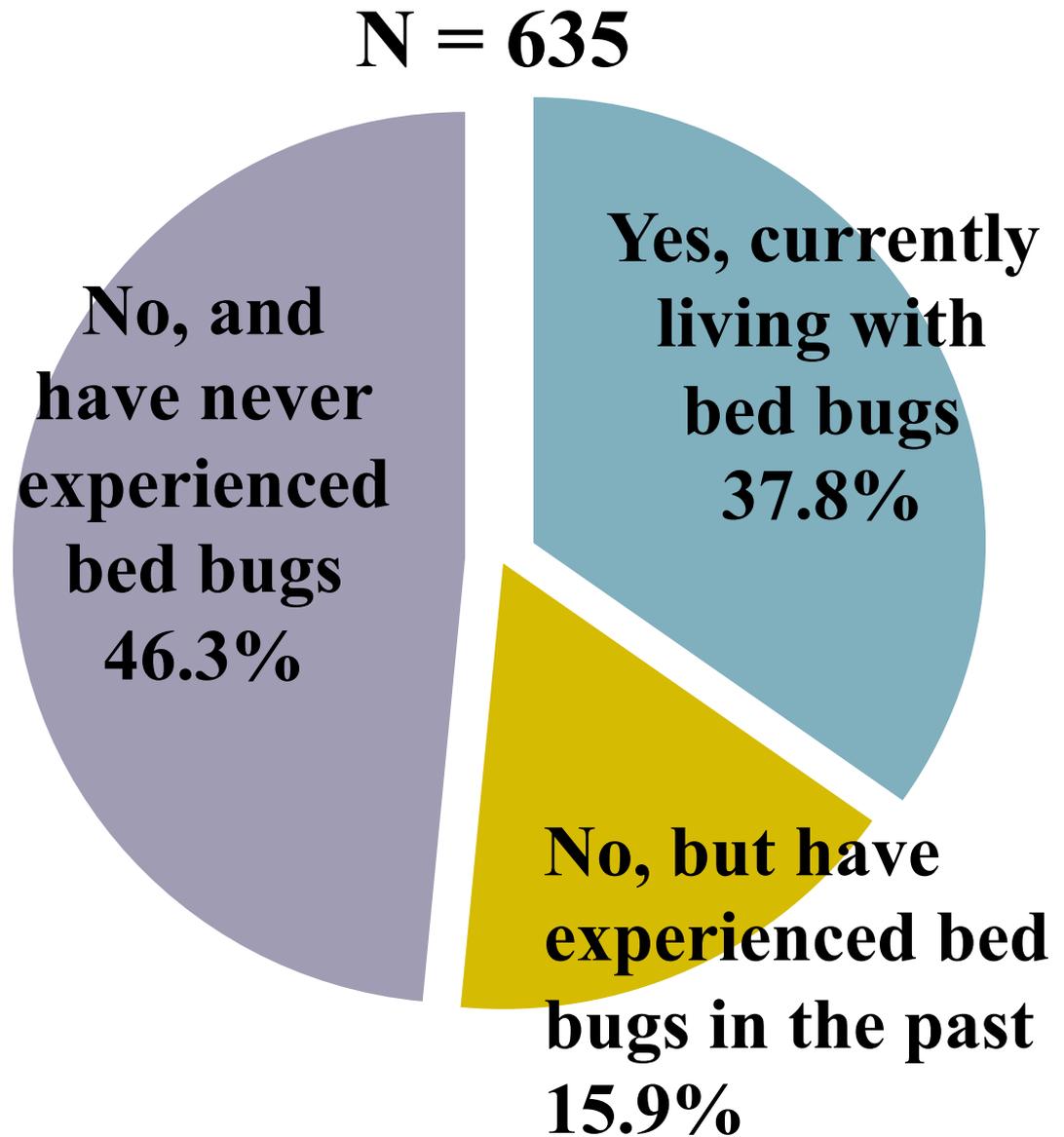


**Demographic Information**  
age, gender, # of people in household, annual household income, living situation, disability, and location

# Results

Are you currently living in a place with bed bugs?

- Reached adults of all ages
- 64.6% female  
35.4% male



# Statistical Analyses

Stratified (blocked) contingency tables (CMH test of general association); effects based on *a priori* hypotheses permitted by sample sizes

- Effects:
  - Income (poverty vs no poverty)\*
  - Children (present vs absent)
  - Living arrangements (owning vs renting vs alternate)
  - Mobility (moved, traveled, hosted  $\geq 4$  times, 2<sup>nd</sup> hand furnishings  $\geq 2$  times/year vs none of these)
- Response:
  - Current or previous BB vs no history

\*Based on Federal Register 2016 poverty guidelines

# Poverty

## Stratified over Children, Living, Mobility

General Association = 29.40,  $df = 1$ ,  $P < 0.01$ ,  $n = 537$

*Poverty was associated with BB infestations across other effects*

# Living

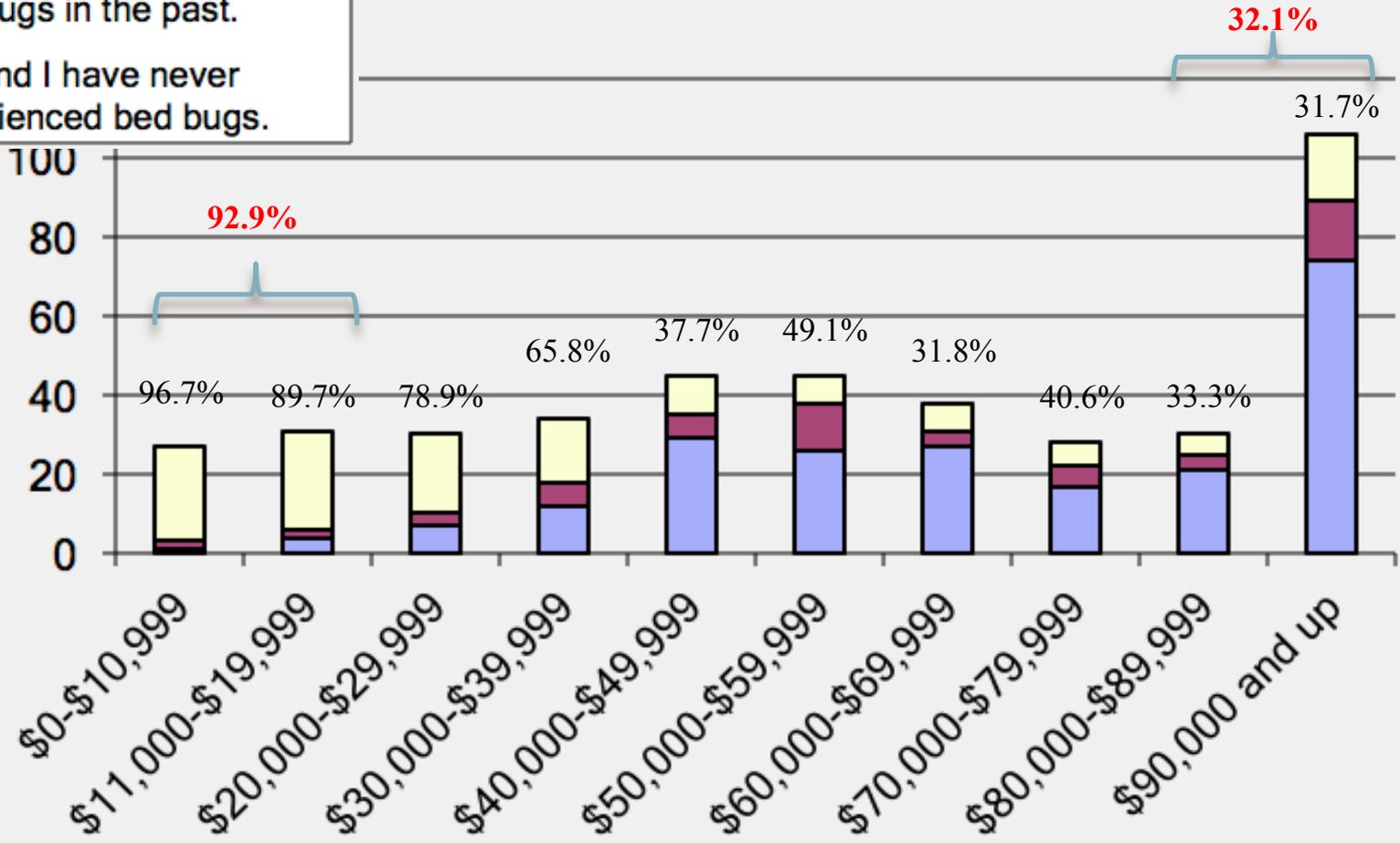
## Stratified over Children, Poverty, Mobility

General Association = 35.14,  $df = 2$ ,  $P < 0.01$ ,  $n = 537$

*Owning associated with lower incidence of BB compared with renting or alternative arrangement*

- Yes.
- No, but I have experienced bed bugs in the past.
- No, and I have never experienced bed bugs.

## What is your yearly household income?



People with lower annual income reported more infestations

# Mobility

## Stratified over Children, Living, Poverty

General Association = 4.43,  $df = 1$ ,  $P < 0.035$ ,  $n = 537$

*Increased mobility weakly associated with lower incidence of  
BB infestation*

*May be interacting with other effects*

# Children

## Stratified over Living, Poverty, Mobility

General Association = 2.95,  $df = 1$ ,  $P < 0.086$ ,  $n = 537$

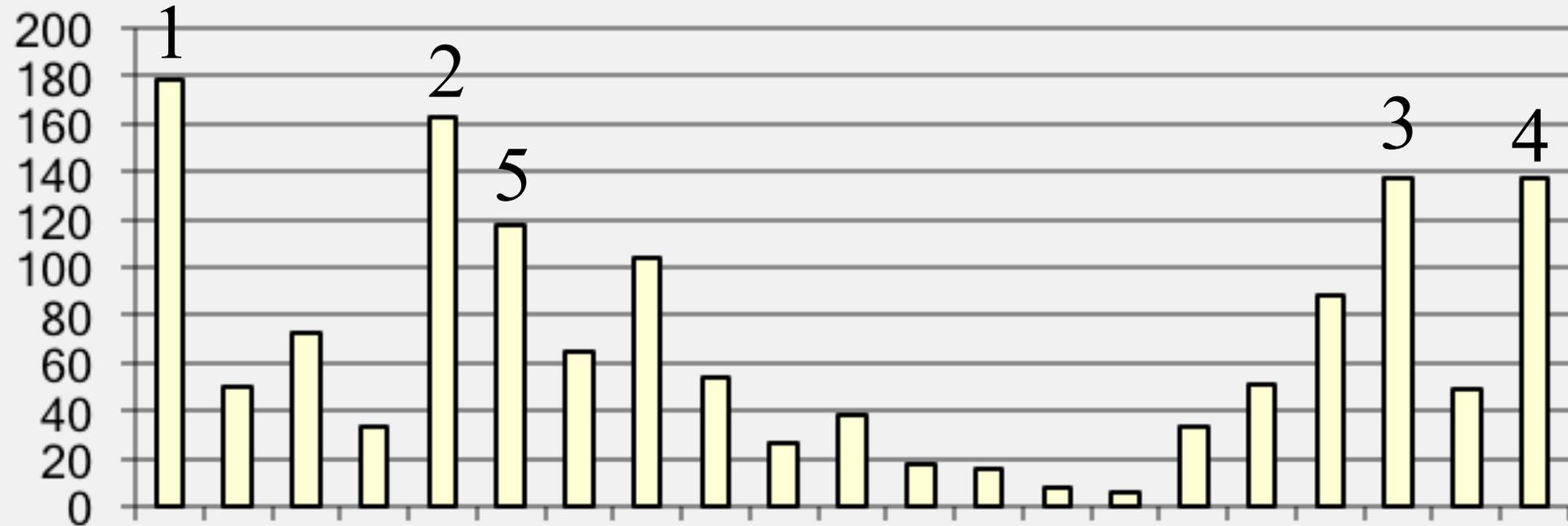
*Presence of children is only weakly suggestive of  
association with BB infestation*

- People currently living with bed bugs reported the highest number of people per household
- People reporting disabilities may have a higher incidence of bed bugs
- About 50% of people with bed bugs or a history of bed bugs reported swollen, itchy bumps or sores



# Impacts

## People with current infestations



The top five impacts are: 1. suffer sleep loss, **87.3%**

2. cannot relax, **79.9%**

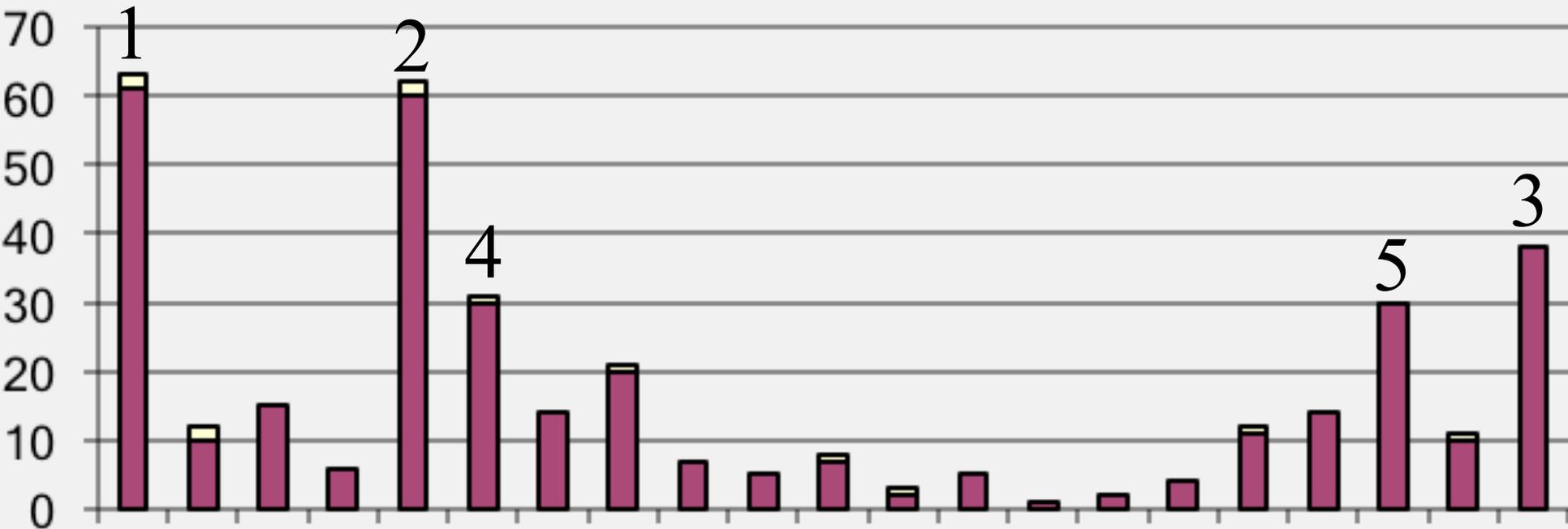
3. depression and / or desperation, **67.2%**

4. concerns that they transferred bed bugs to other locations, **67.2%**

5. financial losses, **57.8%**

# Impacts

## People with previous infestations



The top five impacts are: 1. suffer sleep loss, **87.5%**

2. cannot relax, **86.1%**

3. concerns that they transferred bed bugs to other locations, **52.8%**

4. financial losses, **43.1%**

5. depression and / or desperation, **41.7%**

# Survey Results on Management

- 54.8% of people with bed bugs applied at least 2 retail pesticides inside their home
- 22.0% used foggers known to be completely ineffective
- 22.7% had applied pesticides more than 8 times
- 23.3% had applied non-pesticide product chemicals such as gasoline, alcohol or cleaning chemicals



## Who had a pest management service that applied a pesticide?

- 37.9% of people living with bed bugs
- 55% of people with a history of bed bugs
- 3% of people with no bed bug history had a pest management service every month (17.8% had a contract that included the application of pesticides only when needed)

76% resolved their infestation within 6 months of confirming a problem

# Conclusions

# Overwhelming need for community education



## DRAFT FEDERAL STRATEGY ON BED BUGS

September 2013



Prepared by

The Federal Bed Bug Workgroup<sup>1</sup>

<sup>1</sup> The Draft Federal Strategy on Bed Bugs reflects a broad-based consensus of federal agencies. It is an outcome of the collaborative interagency Federal Bed Bug Workgroup. The Draft Strategy was authored by key agencies (CDC, EPA, HUD, USDA) and includes technical information and input from the Department of Defense and the National Institutes of Health. Photo courtesy of Dr. Harold Harlan and the Armed Forces Pest Management Board ([www.afpmab.org](http://www.afpmab.org)).



parasitic insects that feed exclusively on blood to feed on humans, although they will take other animals if humans are not available. introduced into homes by pets. There are insects that look very similar. There are other animals, e.g., bat house. anxiety, t- information was on email or the

ment if an apartment is d bugs. materials on bed bugs to 1) and (2) to do structural e, or be a business license oyed by a company with a party license. Employees (city municipality workers) nse, and are not required id qualifying party license icensed Pest Management estations. ring a clearly written Bed use agreements. LEASE day of service contracts may not may be advisable to hire Professional to manage or and to verify there are wmes. If contracting with provider, it is advisable to ns are third party certified ation (WDDO), Nation

- Knowledge gap among the target audience of non-English speakers and low-income residents
- Extreme pesticide and chemical abuse at a higher than expected level



- A critical need for bed bug education and training for pest management professionals
- Potential pesticide resistant issues among bed bug populations



**IPM  
DELIVERS**

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