

ATAHC™ - Allergy Technologies' Affordable Housing Control and Prevention Program for Bed Bugs

Synopsis and Consolidated Interim Results

The objective of this demonstration is to confirm the ATAHC™ program as an affordable and sustainable model of control and prevention of bed bugs at the community level within affordable housing complexes. Bed bugs continue to plague affordable housing nationwide despite advances in detection and treatment strategies. The trajectory of bed bug infestations continues to rise in these community housing environments while negatively impacting the 'quality of life' of residents. This increase in infestations also compromises staff and causes unsustainable year-over-year remediation costs for cash-strapped management of affordable housing. Rather than continuing repetitive reactive treatments, this program's focus is on the **prevention of infestations**; a strategy already established to significantly reduce bed bug incidents in hospitality, assisted living, dormitory settings. In addition to the use of select products field proven to significantly prevent infestations from developing, **this proactive bed bug strategic program is supported by early detection through enhanced staff and resident engagement leading to prompt intervention.** We are convinced that extending this preventive, IPM-centric approach to affordable housing will significantly reduce the bed bug burden allowing residents to enjoy a lifestyle not embroiled in the constant struggle with this pest.

The two-year comprehensive and strategically designed program is first being conducted as a demonstration in a selected housing site located in Philadelphia. Collaborating sponsors, many of whom are manufacturers, have donated their respective products and expertise to this ATAHC demonstration and represent contributions well over \$100,000. Specific to the 470-unit housing complex selected, the property was divided into "4 quadrants" facilitating implementation of the Program incrementally.

ATAHC is a multi-layered, multi-faceted strategic approach adopting the best products and methods to initially clear the housing complex of detectable bed bugs. After clearance of bed bugs facility-wide, environmentally low-impact, long-lasting, proven preventive products (i.e. active mattress liners and insecticidal dust) will be applied throughout the complex (Phase I).

- Bed bug detection initially was performed facility-wide through canine inspection confirmed by trained Pest Management Professionals (PMPs) who graded the degree of infestation in each positive unit.
- Every unit initially positive for bed bugs was thermally remediated regardless of infestation grade.
- After clearing bed bugs found in units throughout the initial inspection, **every unit** was designated to participate in the preventive phase of the demonstration. Core preventive

components include the installation of active mattress liners on all bedding (box spring preferably) and application of desiccant dust.

- Monitors (bed bug interceptors) were installed under all beds, couches and upholstered seating that may be used for sleeping).
- At any time throughout the demonstration, if a mattress cannot be remediated sufficiently to clear all detectable bed bugs, and where discarding it is not financially possible, an encasement will be installed to salvage the mattress for its continued use. In absence of a box spring, an active mattress liner will be installed inverted over the encasement.
- For common areas, a limited number of active monitors (with lures) were used to detect bed bug activity.

During the demonstration, **it is anticipated that a limited number of ‘breakthrough’ events (re-introductions) will occur.** In contrast to the typical reactive approach, the ATAHC Program emphasizes bed bug detection and intervention at an introductory stage. In combination with clearing all units of bed bugs at the outset, the **ATAHC Program includes a preventive phase** using products proven to provide long-lasting control, monthly PMP inspection of monitors for bed bug presence, quarterly staff inspections, and is aided by timely reporting through enhanced resident engagement (Phase II). It is anticipated that this approach will result in:

- **Significantly less disruption and expense resulting from adoption of a localized treatment strategy as compared to unit-wide thermal treatments required of more extensive infestations.**
- Early engagement with new residents moving into the housing facility who may introduce bed bugs
- The contracted PMP choosing from a designated array of ‘best products proven by field success’ for treatment.
- Remediation of mattresses, when required, being limited to vacuuming, steam, and use of an insecticidal/bactericidal/fungicidal alcohol-based spray (if chosen).
- Reduction of bed bugs in personal belongings through the extensive usage of IPM-centric strategies including clothes dryers and potential incorporation of heating enclosures (e.g., tents) for larger furniture items.

Demonstration success relies on an enhanced cooperative effort between property management, the pest management professional, and residents. Traditionally, some residents have been unable or unwilling to follow important recommendations necessary for the elimination of bed bugs from their units.

ATAHC is distinguished by the requirement that property management adopt an active role to support this bed bug control and prevention program through supportive engagement and assistance of residents.

This demonstration includes monthly PMP inspection of monitors in units for bed bugs and on a quarterly basis by staff, previously trained by the Northeast IPM Center (@ Cornell; a HUD-funded agency). A positive monitor finding by either PMP or staff, or resident complaint of suspected bed bugs logged with Management will trigger a thorough visual inspection by the contracted PMP, who will grade the level of infestation and hence treatment approach required. Ideally, engagement of residents resulting in timely reporting and early detection by PMP and/or staff will facilitate prompt intervention with less invasive, localized treatments. In addition, it is anticipated that residents will begin to enjoy an improved 'quality of life' through fewer bed bug issues, reduced contact exposure to service technicians and less disruptive treatments if a re-introduction occurs.

The ATAHC Program focuses on the following resident-related activities:

- Coupling active staff involvement with heightened resident engagement. This demonstration places heavy emphasis on cultural and language diversity and being responsive to resident's needs at the property site.
- Tailored education of residents by the Northeast IPM Center (or equivalent) focusing on extinguishing the stigma of bed bugs, alleviating the fear of eviction, and teaching basic detection of bed bugs are key to enhanced resident involvement.
- Distribution of collateral educational materials translated into the predominant languages spoken by residents at the demonstration site. Multi-lingual residents are continuously recruited to assist in conveying the 'message'.
- Specific meetings with resident councils explaining the importance of the demonstration with active resident involvement continuing to be conducted throughout the demonstration.
- Ongoing incentivization of residents as gestures of 'thanks' for early reporting of bed bug issues

Administration of the demonstration is conducted by on-site property management with input from the contracted PMP, and Resource/Oversight Committee. This Committee includes the lead contributing sponsor, an independent data monitor, representation from 'StopPests in Housing' (HUD-sponsored, Cornell University, NY) and a housing authority or property management designee. Administrative and data activities include:

- Monthly data compilation for the demonstration site and preparation of quarterly reports highlighting bed bug incident frequency, treatment requirements, and staff and resident participation.
- Six (6) month reviews evaluating infestation grading and required treatment process

- throughout the building complex with a goal to affect a data-supported adjustment of the protocol to using less disruptive, less expensive localized treatments.
- Comparison with historical data when pre-demonstration data as made available.
- Preparation of a Year One annual report detailing the previous 12 months of activity, cost analysis, and assessment of demonstration progress and options to consider for improvement in Year Two of the ATAHC Program.
- At the conclusion of Year Two, preparation of a composite 2-year report suitable for publication (Journal of Housing and Community Development; NAHRO) expanding on the 1st year’s report with recommendations for replication of the ATAHC Program in other affordable housing sites.

Consolidated Interim Results ~ 12 Months

During the first 12 months of the Demonstration, 17 (out of a total of 470 units) units were heat treated to affect bed bug control². Several events occurred through Phase I of the demonstration evidencing a continuous bed bug burden placed upon the property complex. For example, after preventive measures had been installed in a unit in Quad II, and during the 2nd follow-up inspection post heat treatment, dead bed bugs were found on the bed frame in the second bedroom. This observation is a direct result of the active mattress liner installed in proximity to the frame and exemplifies one situation where bed bugs introduced into a unit were killed by the liner, preventing a more expansive infestation.

In another example, a resident in Quad III after preventive measures were installed in their unit discarded the active mattress liner while replacing a box spring; a new liner was not installed on the replacement box spring. Bed bugs were either re-introduced with the newly introduced box spring or at some subsequent time requiring thermal remediation.

Summary Table of Demonstration Details

| | <u>Quad I</u> | <u>Quad II</u> | <u>Quad III</u> | <u>Quad IV</u> |
|----------------------|---------------|----------------|-----------------|-------------------------|
| # Units: | 165 | 123 | 97 | 85 |
| # Bedrooms: | 1-2 | 2-4 | 2-4 | 2-4 |
| # Liners Installed | 191 | 290 | 216 | in process ¹ |
| # Units Heat Treated | 5 | 6 | 3 | 3 ² |
| # Bed bug monitors | 595 | 591 | 461 | in process ¹ |

1. At the time of this writing, the last 27 units in the housing complex are scheduled for installation of preventive measures.

2. One unit is in process of thermal remediation resulting from a bed bug introduction discovered at the time of the installation of preventive measures.

COVID-19

In February 2020, COVID-19 impacted the demonstration with property Management halting the canine screening of new units while allowing previously treated units to continue to be monitored. Management's decision to slow the demonstration was based upon concern of the coronavirus infection rate among staff and residents and staff/resident/service technician contact. The demonstration resumed in August 2020 with the remaining Quad III and Quad IV units being screened, treated when indicated, and preventive measures installed.

Resident Newsletters

During the first year of the Demonstration three (3) 'Resident Newsletters' were distributed to all unit occupants in the selected affordable housing complex site. These communications are designed to express sensitivity and assurance of adherence to all federal and local guidelines during the COVID pandemic, inform residents as to progress affected including results achieved to date, and to re-enforce enthusiasm, cooperativity and engagement as to early reporting of any bed bug suspected activity.

Conclusions

- **As a result of 470 units having been screened, treated wherever necessary and preventive measures installed, over 97.4% of the units have not had a reintroduction or re-emergence of bed bugs to date. All reported bed bug-related events after the completion of Phase I are the result of routine social activities (e.g., exchange of bedding, removal of preventive measures) common in community living environments.**
- **There was an 81% reduction in the number of required thermal treatments (as a result of the initial screening process) which translated into a minimum of \$40,000 savings to property Management for the first year of the Demonstration as compared to historical annual figures. Projected savings for Year 2 are significantly higher.**
- **PMP technician time on site was reduced by approximately 40% by implementing the preventive strategy set forth in the Program. Given the social distancing guidelines required during the COVID pandemic, this represents a highly important and significant reduction in less contact time between residents and staff.**