Bed Bugs in Elderly and Disabled, Low-income Housing – Getting Real!

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Common pest and pest management issues

- German cockroaches
- Bed bugs
- Pesticide and chemical use patterns
Building on previous activities in OR and AZ
Inner-city case study in AZ elderly/disabled public housing

- Residents are 62+ senior and/or disabled
- Independent living locations
- Per-Capita Income $

| AZ County | (1) 43K | (2) 9.6K | (3) 12K | (4) 11.4K | (5) 29K | $27.8K |

Rent: 30% of adjusted annual income or 10% of gross
Typically

- Sites in high income areas have fewer building related “issues” in general
- Elderly and disabled sites may have less severe pest issues, compared with general public housing
- So this could be....
Site (1)

- 156 units
- 1962 (54 years old)
- 4 stories
Whole building assessment

- Visual inspection
- Sticky monitoring traps (2 in kitchen)
- Bed bug volcano traps (2 under or near bed or sleeping area)
- Pesticide and chemical products
German cockroaches *Blattella germanica*

- In-home cockroach pest
- 40% units infested
German cockroaches and health impacts

- 23 - 60% urban asthmatics are sensitive to cockroach allergens
- Cockroach allergy associated with severe asthma among elderly
German cockroaches and health impacts

- Elderly have poor perception of asthma symptoms
- Increased morbidity
Cockroaches passively transport microbes on their body, and in their gut. *Escherichia coli* and *Salmonella* are common causes of food poisoning and gastroenteritis.
German cockroaches and health impacts

- Elderly are vulnerable to gastroenteritis and food-borne infections:
  - Changes in immune response
  - Gastrointestinal physiology
  - Use of immunosuppressive or acid-suppressive medications
  - Comorbid conditions associated with aging
Bed bugs
*Cimex lectularius*

- Blood feeding parasites of humans
- 14% units infested
Bed bugs and health impacts

- Not competent vectors of disease causing pathogens
- Annoying biting pests causing swollen, itchy bumps
- Sleep loss
- Anxiety, worry and depression
- Blood loss, anemia
Pesticides and chemicals applied by residents

- Retail (OTC & internet), illicit, and legacy
- 59% units with pesticide products
Pesticides and chemicals applied by residents

- Cockroach bait stations
- Aerosol sprays
- Battery powered sprayers
- Pump action sprayers
- Powders
- TRF
- Gels
- Vapor strips
Pesticides and chemicals applied by residents

- >145 products
- 2 unidentifiable powders
- Large volume products
- Concentrates
- Outdoor-only products
- Legacy products
- 1 monitoring trap
- Interceptor traps
- Mattress encasements
- No PPE
Pesticides and chemicals applied by residents

- Pyrethrins/pyrethroid
- Phenylpyrazole
- Borates
- Diatomaceous earth/silica
- Amidinohydrazone
- Organophosphates
- Carbamates
- Second generation anticoagulant
Pesticides and chemicals applied by residents

- Off-label
- Excessive
- No PPE
- Hazardous material cleanup ($5K)
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Pesticide mysteries
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Pesticide residues in 8 units – kitchen floor swab samples

- Background common areas: bifenthrin, cyfluthrin, cyhalothrin, piperonyl butoxide (PB)
- A) Appropriate Maxforce FC roach bait stations (fipronil)
  - Residues: bifenthrin, cypermethrin, deltamethrin, phenothrin, cyfluthrin, cyhalothrin, prallethrin
  - Fipronil from bait stations does not show up
  - Lots of other things do! Relying on physically found products does not indicate residue load
Pesticide residue

B) 35 Maxforce roach bait stations in kitchen (fipronil)
- Residues: dichlorvos
- Dichlorvos observed in next door apartment
Pesticide residue

HOUSEHOLD USES

GARAGES, SHEDS, AND/OR STORAGE UNITS

ATTICS AND CRAWL SPACES

FOR USE IN UNOCCUPIED AREAS; NOT FOR USE IN HOMES EXCEPT GARAGES, ATTICS, CRAWL SPACES AND SHEDS OCCUPIED BY PEOPLE FOR LESS THAN 4 HOURS PER DAY.

Vacation Homes, Ranch Houses, Farm Houses, Cabins, Mobile Homes, Boats that are unoccupied for more than 4 months immediately following placement of pest strip.

Garages, Storage Units, Attics, Crawl Spaces, Boathouses, Sheds occupied by people for less than 4 hours per day.
Pesticide residue

- C) Legacy pesticides present (fipronil, esfenvalerate, allethrin, N-octyl bicycloheptene, permethrin, PB, pyrethrin; imiprothrin, cypermethrin)
  - Residues: deltamethrin, diazinon, permethrin, cyfluthrin, cyhalothrin, PB
  - Little in the way of correlation

- D) Unidentifiable white powder
  - Residues: cypermethrin, cyfluthrin, cyhalothrin, PB
Pesticide residue

- E) Multiple large volume pesticide containers (bifenthrin, gamma cyhalothrin, imiprothrin, deltamethrin)
  - Residues: nothing
  - No correlation

- F) Excessive use of Demon WP ordered from internet (cypermethrin)
  - Residues: bifenthrin, cypermethrin, permethrin, cyfluthrin, cyhalothrin, PB
Pesticide residue

- G) Multiple pesticide products in each room - living/bed, kitchen, bathroom (bifenthrin, cyhalothrin, imiprothrin, deltamethrin)
  - Residues: cypermethrin, deltamethrin, cyfluthrin, cyhalothrin, PB
  - Some correlation

- H) Multiple pesticide products in kitchen (imiprothrin, cypermethrin, boric acid)
  - Residues: cypermethrin, cyfluthrin, cyhalothrin, PB
  - Some correlation
Pesticide exposure hazards
Pesticide exposure hazards
Conducive conditions – German cockroaches

- Food
- Clutter
1. Conducive conditions – German cockroaches

- Food
- Clutter
Conducive conditions – German cockroaches

- But we also trapped cockroaches in clean and tidy units
Cockroaches

- No inspection
- Minimal reporting
- Uninformed staff
- Contract was not being adhered to
- Cost <$1/unit/month
- No bait rotation
- Sanitation protocols necessary
Cockroaches

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- Sanitation protocols necessary
Let's get rid of the cockroaches

- Rotation of fipronil (phenylpyrazole) and dinotefuran (neonicotinoid) bait
- Policies regarding waste disposal
- In-home help
Conducive conditions – bed bugs

- Sedentary residents
- Impaired vision
- Higher tolerance
- High heat?
- Low light?
Conducive conditions – bed bugs
Conducive conditions – bed bugs
Bed bugs

- No inspection
- Minimal reporting
  - eviction concerns
- Uninformed but very caring staff
- Incorrect application information reported on service tickets
- Poor bed bug protocol even so
- “Insufficient prep” so no treatment
Lets get rid of the bed bugs

- Full prep is **impossible** for some residents
- Effective service protocol lacking
- Effective 2 week unit turn-over protocol lacking
Let's get real

- Residents should **not** be relied upon to report bed bugs
  - They don’t know they are there
  - They don't know they are bed bugs
  - Eviction concerns
  - Loss of property concern
  - Cost concerns

- Annual inspections are minimal
Let's get real

- Residents should **not** be relied upon to prep for bed bug services
  - They may be physically incapable
  - They may be mentally incapable
- **Qualified** help is imperative
20% elderly public housing residents classified as persons with disabilities, compared with only 13% of U.S. elderly persons

Many require assistance with basic tasks
The Housing Authority's 504 Reasonable Accommodation Housing Policy and Procedures

A change; exception; or adjustment to a rule, policy, practice or service that may be necessary for a person with a disability to have an equal opportunity to use and enjoy a housing unit; access to facilities, activities or programs.
Simple Prep sheet

Please Complete the Following Prior to Initial Bed Bug Treatment

1. Laundry

Bag all items that can be laundered, dry cleaned, or dried in a dryer. This is everything in closets, all linen on all beds, everything in dressers, nightstands, anything in the hamper. All items that can be laundered, CLEAN OR NOT CLEAN must be laundered in HOT WATER SETTING.

*This must be completed prior to initial treatment.

* Use NEW bags when laundry items are finished

*DO NOT USE THE SAME BAGS WHICH YOU INITIALLY USED TO BAG LAUNDRY ITEMS

*Place all bags in kitchen or bathroom once laundered

*Remove all plastics from bedding i.e. mattress, box spring, and etc.

2. Non-Laundry Items

All non-laundry items must be removed from drawers, shelves, nightstands, closets, and anything of the like.

*Remove all items from top of dressers, chest of drawers, night stands, tables, etc.

*ALL LUGGAGE IS TO BE LEFT IN ROOM FOR TREATMENT

*Closet should be completely empty. Even clothes hangers must be removed

*During the removal of these items please look over each item for bed bugs

*Please all items that aren't infected in kitchen or bathroom

*All stuffed animals must be cleaned and dried as per manufacturer's tag.

3. Furniture

Please move any furniture and like items away from the baseboard to allow access for inspection/treatment. BEDS MUST BE PROPPED AGAINST THE WALL. If you need assistance moving larger items, please MAKE ARRANGEMENTS PRIOR TO INITIAL TREATMENT FOR HELP NEEDED

4. Pictures and Décor

Have ALL framed pictures, or hung décor, removed from walls and placed in same area for inspection and if necessary, treatment as applicable. Remove outer fixtures, switches, wall bookshelves, and etc.

5. Floors

All floors need to be clear of ANY AND ALL items and thoroughly vacuumed prior to all treatments.

*When finished vacuuming, empty bed or receptacle on vacuum and immediately take your trash out. Please vacuum home daily after treatment.

6. Post Treatment Procedure

To avoid laundering all items prior to each visit, make arrangements to comfortably live without returning all laundered items back in dressers and closets until program is finished.

All other items can be put back into their original location. However, they must be removed for each treatment. DO NOT PERFORM ANY TREATMENTS OF YOUR OWN, NO HOME REMEDIES. This could alter the effectiveness of the treatment and prolong the control of your home. DO NOT UNZIP COVERS FOR THE LIFE OF YOUR MATTRESS FOR ANY REASON.
3. Furniture

Please move any furniture and like items away from the baseboard to allow access for inspection/treatment. BEDS MUST BE PROPPED AGAINST THE WALL. *If you need assistance moving larger items, please MAKE ARRANGEMENTS PRIOR TO INITIAL TREATMENT FOR HELP NEEDED.

4. Pictures and Décor

Have ALL framed pictures, or hung décor, removed from walls and placed in same area for inspection and if necessary, treatment as applicable. Remove outlet fixtures, switches, wall bookshelves, and etc.
Quite simply not going to happen
Sufficient resources MUST be available to effectively eliminate bed bugs in an ongoing manner

- Funds to pay for effective control
- Sound contract specifications and informed staff overseeing practices, if necessary
- Staff to prep and manage disposal/movement of items
- Qualified in-home help (laundering, bagging)
Or... let's get comfortable with our elderly and disabled living with bed bugs.
Do not......

- Play the blame game
- Go low bid – you get what you pay for
- Mandate throw outs (case-by-case)
- Mandate residents move to new apartment (case-by-case)
- Forget surrounding units
- Move new residents into previously infested units before elimination is certain
Do......

- Implement a bed bug policy or plan
- Conduct regular inspection of units and common areas
- Have an effective service contract
- Work with experienced pest managers
- Conduct resident education efforts
- Provide training for housing staff
Bed bug control elements

- Move-in protocol
- Inspection and monitoring
- Encourage awareness and reporting
- Clean, reduce clutter, organize
- Vacuum
- Encasements
- Seal and repair
- Heat, cold, steam
- Pesticides
- Infested item disposal plan
- Unit turn-over protocol
So 8 months of……

- Significant communication challenges
- Multiple housing staff changes
- Housing staff “beyond the call of duty”
- Multiple pest management companies
- Pest management company staff “beyond the call of duty”
- Multiple human resources and employment job description challenges
- UA and OPM staff going “beyond the call of duty”
- Wonderful resident cooperation
- One significant resident complaint
So 8 months of...

- Numerous strategizing sessions with housing management
- Significant changes to pest management practices - eventually
- Education for housing staff
- Lots of face-time
What about the bugs?

- Huge reduction in bed bug and German cockroach levels
- **No** severely infested bed bug units
- Only low level bed bugs still persisting (1-20 live bugs)
- 57% reduction in number of units with bed bugs
- 31% reduction in number of units with German cockroaches
- Difficult to change pest management practices – even when clearly necessary
Final thoughts for public housing

3,150 public housing agencies manage >1.2 million public housing units in U.S. (1 million occupied)

27% occupied by elderly and non-elderly disabled

By 2020, 1 in 6 Americans will be 65 or older

Pest infestation (bed bugs in particular) add to physical and social stress
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