Extreme Pesticide Use in Response to Cimex lectularius and Blattella germanica Infestations
NIFA Applied Research and Development Program

- Improve pest management in housing
- Reduce risks associated with pests and pest management practices

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Inner-city case study in AZ public housing

- Residents are 62+ senior and/or disabled
- Independent living but ...........
- Low income

$ Per-Capita Income by Zip

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>Maricopa County</th>
</tr>
</thead>
<tbody>
<tr>
<td>43,000</td>
<td>9,600</td>
<td>12,000</td>
<td>11,400</td>
<td>29,000</td>
<td><strong>27,800</strong></td>
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</tbody>
</table>
Sites all >50 years old

1) 156
2) 108
3) 120
4) 112
5) 116
612 units
Pest incidence & ..............

- Per-capita income (poverty structure & social problems in lower income areas)
- Sanitation and clutter
- Smokers
- Pet owners
- Physical disability
- OTC pesticide use
Whole building assessment

- Visual inspection
- Sticky monitoring traps (2 in kitchen)
- Bed bug volcano traps (2 under or near bed or sleeping area)
- OTC pesticide products
- Sanitation and clutter score
- Professional pest management
Pest and pest management issues

- German cockroaches
- Bed bugs
- Poor low-bid PM service
- Hazardous resident pesticide use
German cockroaches *Blattella germanica*

- 29-100% units
Bed bugs
*Cimex lectularius*

- 3-15% units
Poor low-bid pest management service

- Initial contract cost <$0.80/unit/month
- Inaccurate pesticide use reporting
- Failure to fulfill contract specifications
- Poor contract specifications
Pesticides applied by residents

- Retail (OTC & internet), illicit, and legacy
- 26-60% units with pesticide products
- Highest OTC (site 1) use had no correlation with pest levels
Pesticides applied by residents

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

- Off-label
- Excessive
- No PPE
- Hazardous material cleanup ($5K)
# Kitchen floor pesticide residue analysis

| 160,000 X Cypermethrin GC/MS detectable levels |

<table>
<thead>
<tr>
<th>Allethrin</th>
<th>Bifenthrin</th>
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<tbody>
<tr>
<td>Chlorpyrifos</td>
<td>Cypermethrin</td>
</tr>
<tr>
<td>DDT</td>
<td>Permethrin</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>Phenothrin</td>
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<tr>
<td>Diazinon</td>
<td>Cyfluthrin</td>
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<tr>
<td>Esfenvalerate</td>
<td>Cyhalothrin</td>
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<tr>
<td>Fipronil</td>
<td>Dichlorvos</td>
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<tr>
<td>Malathion</td>
<td>Piperonyl</td>
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<tr>
<td></td>
<td>Butoxide</td>
</tr>
<tr>
<td></td>
<td>Prallethrin</td>
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</table>
Site 1 highest resident pesticide use did NOT have the highest pest incidence

- Most pest complaints
- Youngest average age
- Lowest sanitation scores
- Not the most cluttered
- High psychiatric illness incidence
- More able-bodied
- Highest % women
- Highest % smokers

- Lowest REAC
- Highest per capita income area
- Highest bed bugs
- Considered to house the most feisty residents
Let’s get rid of the cockroaches

- Rotation of fipronil (phenylpyrazole) and dinotefuran (neonicotinoid) bait
- Policies regarding waste disposal ???
- In-home help
Let’s get rid of the bed bugs

- Extensive prep is **impossible** for residents
- Service protocol to include:
  - wall void CimeXa,
  - rotation of dual MOA (pyrethroid + neonicotinoid),
  - vacuum, dryer use
- Stopped resident relocation
- Effective 2 week unit turn-over protocol ??
Let’s get real

- Residents not asked to change their living habits
- Huge reduction in bed bug and German cockroach levels (>90%)
- Increase in PM costs
Satisfaction  

1 = completely dissatisfied with pest levels  
5 = very satisfied

- Before residents - 1.71
- Before staff - 1.0
- Now residents - 4.15
- Now staff - 4.8

2020 - 1 in 6 Americans 65 or older