


Oh no, bugs!

Understanding Infestation

Presented by:
Dion Lerman, MPH, ACE, HHS
Pennsylvania Integrated Pest Management Program

**PennState Extension**

Philadelphia Center

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Tenant's rights free services:

- **TURN:** Tenant Union Representative Network (215) 940-3900
- **CLS:** Community Legal Services (215) 981-3798

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- Based on Peer-reviewed literature
(Citation Date)
- Available on request:
 - Complete Bibliography
 - Research Papers
 - Protocols
 - Educational materials
 - Website resources
- Constantly updated



***“Any destructive or
troublesome organism”***

- Affect public health
- Destroy food or property
- Create a nuisance

*Something we don't like,
where we don't want it!*



Rodent-chewed wire – fire hazard!



Mice nesting – wherever!

What do they do to us?



- Pests cause allergies & can trigger asthma – also eczema, other allergies
 - Mice - 83% of *all* homes!
 - 95% low-income
 - 89% of schools!
 - Cockroaches – up to 63% of homes
- Asthma: rate has doubled in 20 years
 - Up to 30% or more of children under 18
 - Main cause of lost school days... and work days!
 - African American children are hospitalized and die 2x as White children; Latino's – 3x!
- Bite us – Lyme, West Nile, rabies
 - Thousands of rat bites each year in US!
- Infectious disease vectors



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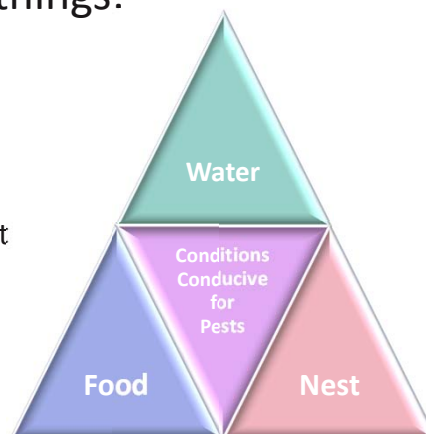


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What do pests want?

- All pests want **three** things:

1. Food
2. Water
3. Harborage
 - Somewhere to hide & nest
 - Ideally: warm



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What is an infestation?

- The state of being invaded or overrun by pests or parasites
- The actual organisms living on or in the host habitat
- More than one bug!
- Usually a colony capable of reproducing



Bed bug aggregation on mattress seam
Photo: Dion Lerman



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Standardized Assessment



Level	Bed Bugs	Cockroaches	Mice	Rats
None	0	0	No sign	No sign
Low	1-10	1-10	1	1
Medium	11-99	11-99	2-3	2-9
High	100-999	100-999	5-19	10-99
Extreme	> 1000	> 1000	20	> 100

Base treatment protocol on assessment!



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How they get in?

- Find out! Do a thorough inspection:
 - Outside of the house
 - Inside: corners, floors, closets & basement
 - *Where have you seen them?*
- Identify the pests found!
 - Online
 - Experienced pest control workers
 - Urban entomologist
 - IPM/Penn State Extension
 - 215-264-0582



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Where do they hide?

- *Where do you see the creature?*
 - Creature droppings
 - Nests and burrows
- Good food & source of water
 - Under sinks, kitchens, garbage cans
- Hidden places
 - Inside walls, cabinets, basements, attics, waste bins, baseboards
- Warm cavities for insects
 - Inside TV's, computers, smoke alarms
- Near entry holes
 - Spotted during outside inspection
- Where people sleep – bed bugs
 - Wheelchairs



Mouse nest under oven

Photo: EA Kasameyer



Cockroaches nesting in baby food case

Photo: Houston Bureau of Children's and Environmental Health



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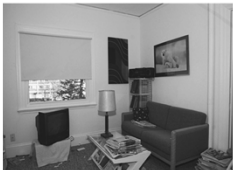
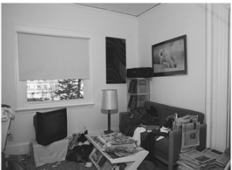
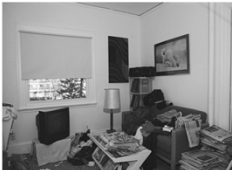






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Clutter Image Rating: Living Room

Please select the photo below that most accurately reflects the amount of clutter in your room.












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CIRS - What 4 looks like...



- All surfaces covered
- Floor covered
- Limited access
- Plies to window height, or above
- Loose debris
- Inappropriate objects (e.g., piles of clothes in LR)

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Inspection Checklist

- General health, sanitation & safety

[illegible]

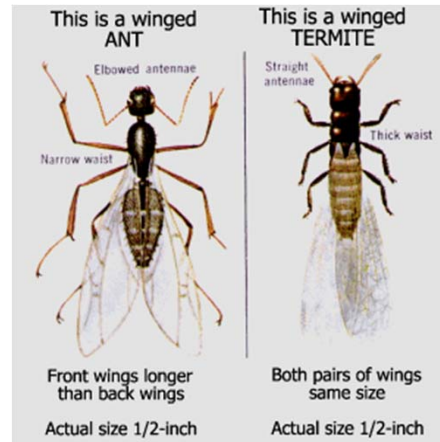
Pest Inspection Checklist

[illegible]

INSPECTION FORM - PEST MANAGEMENT SANITATION RESIDENCES - Homes / Apartments	
D. Kitchen & Dining Areas (continued) 1. Are there any drains? - yes/no - correct, good E. Bathrooms 1. Does floor drain clog or drain? - correct, good 2. Do drains have drain property - no 3. Are plumbing - evidence of leaks - No plumbing - any evidence on fixtures, No - yes, other areas - OK, correct, acceptable, other areas	F. Nonwater Rooms Being Served: 1. Are water pipes (not - adjacent spaces) identified - correct, good 2. Are there drains in floor or structure - yes 3. Any presence of drains in attic or other areas - yes 4. Any evidence of leaking, evidence - correct, good 5. Evidence present in place to avoid - correct, good 6. Are there any drains in place to avoid - correct, good G. Pests (other) 1.1. Spiders 1.2. Cockroaches 1.3. Stored food products (inhabited) 1.4. Other insects 1.5. Fleas 1.6. Mice 1.7. Fleas - insects in place 1.8. Fleas - insects in place 1.9. Fleas - insects in place 1.10. Fleas - insects in place 1.11. Fleas - insects in place 1.12. 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How do you get rid of them?

- Prevent them!
 - Keep 'em out!
- Sanitation
 - Clean & de-clutter
 - Eliminate food & water
- Physical controls
 - Identify them!
 - Chemical controls
 - ***By licensed pros only!***
- Ongoing monitoring



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Hoarded homes make pest control challenging!



- Harm reduction
- Safety days
- Make home safe enough
- Home functional, not home beautiful
- Resident driven
- Reduce, recycle
- Containerize



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Hoarding Prevalence



- Hoarding behaviors affect between **2 - 5%** of the population.
 - The 5% rate is 2x the rate of OCD & 4x the rate of bipolar and schizophrenia.
- In Philadelphia: **23,600-59,000** adults.
 - Hoarding behaviors usually start in adolescence and often increase with age.
- **92% of individuals with Hoarding Disorder have a co-occurring disorder**
 - Depression; Social phobias; Anxiety
 - Substance abuse

Engagement

Remember these guidelines:

- Don't gasp!
- Don't touch!
- Evaluate for safety
- Find something to compliment
- Be grateful & nonjudgmental
- Build trust!
- Be cautious of verbal cues
- Ask questions



Effective Inspection & Treatment Guidelines

- Need to be able to see & access base boards & corners, including in closets.
- Clear under beds
- Containerize stuff in clear plastic bins with tight-fitting lids – stack & move
- CIRS: <3! *At edges...*



Photo: Dini Miller, Virginia Tech



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Assessment based pest control

- Conduct inspection – 2 week intervals
- Estimate population
- Develop treatment protocol
- Apply
- Reinspect & retreat
- Continue until no signs of activity for 6 weeks



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How???

- MCO's now Reimbursing IPM for Medicaid/care
 - Bed bugs
 - Roaches & rodents
 - Maybe not other pests
- Effective January 1, 2019 in SE PA
- PA IPM working with MCO/s & DHS to define
- Probably not fully rolled out until September
 - Provider must be certified Medicaid provider
 - Service Coordinator at MCO approves



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Don't use sprays or foggers!



- They will ruin the bait
- They may trigger asthma attacks
- They may have other health effects
- Children are most at risk
- Foggers can also explode!
- They don't solve the pest problem



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Only licensed professionals may apply pesticide in someone else's home!

Not staff, maintenance, or volunteers...

It's the law!



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Using cockroach bait stations

- Clean up! No other food for the roaches! No hiding places!
- Stick bait 'pucks' near where the roaches were living
- Use **gels** in cracks & crevasses
- Leave until empty, then throw out 'puck'
- *Only use them when you have roaches!*
 - *Pro or resident placement!*



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How do you control mice?

- Get rid of all food & water
 - Keep garbage cans covered
- Seal openings bigger than a pencil width!
 - Stuff hole or crack with copper mesh or wool
 - Seal with silicone caulk, spray foam, spackle or cement
 - Sheet metal or screen for outside
- Use snap traps
- **Don't** use poison in homes!



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Want to make sure pests stay away?



- **Don't** feed or water them!
- **Do** keep doors, screens and repairs in good shape
- Use **monitors**: leave in place & check weekly
 - For insects & mice – sticky traps
 - For mice & rats – snap traps
 - Bed bugs – interceptors
- If you don't have new pests –
 - *Celebrate & keep on!*
- If you find pests, treat again
 - If roach baits did not seem to work, try a different brand
 - Make sure there is no “competing” food source!



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Bed bugs – Don't Panic!!



- You *can* see them.
- Bed bugs *can* be avoided and controlled!
- Not every bite or skin irritation is a bed bug!
- They do *not* cause or spread diseases.
- Tell your property owner and get treatment quickly!
- Simple **heat** and/or **steam** can kill them.
- **Don't** use sprays or foggers



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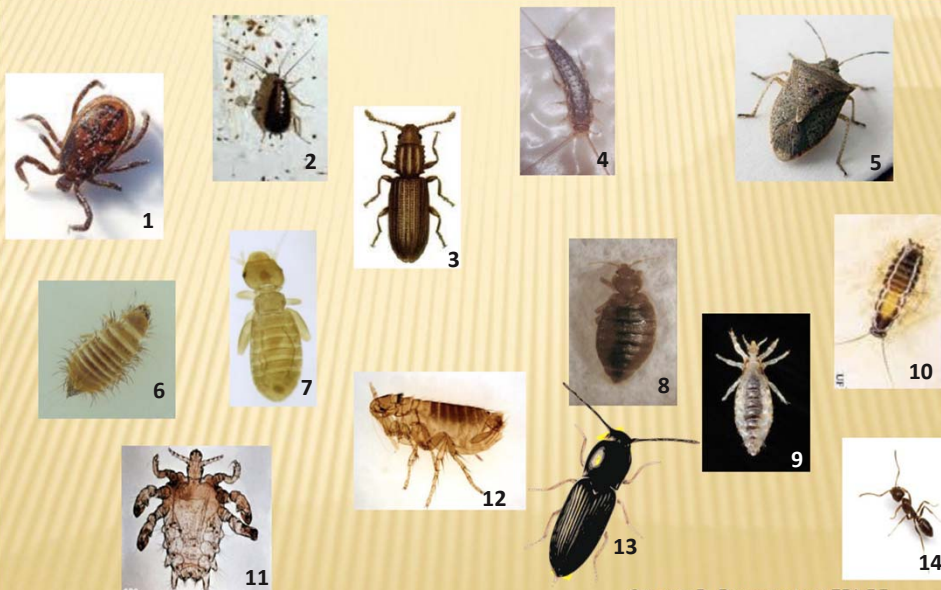
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CAN YOU IDENTIFY THE BED BUG?




Source: D. Baumgartner EPA R5

Identifying Bed Bugs

- Detailed ID
- All 3 stages




NYC

How to Identify a Bed Bug



	Yes	No
1. Is the bug yellowish white or reddish brown in color?	---	---
2. Is the bug flattened with obvious bulks on its body?	---	---
3. Is the bug no bigger than a pencil eraser?	---	---
4. Is the bug round or oval in shape?	---	---
5. Is the bug wingless?	---	---
6. Does the bug have 6 legs and short thick antennae?	---	---
7. Does the bug have well defined protruding eyes?	---	---
8. Does the bug have a leathery skin with small fine hairs?	---	---
9. Does the bug have a round end with no tail-like appendages?	---	---
10. Was the bug found in the sleeping or sitting area?	---	---

If you answered "Yes" for any of the questions 1-10 please refer to the detail descriptions and pictures below.

Adults	Juvenile	Eggs
<ul style="list-style-type: none"> o Oval flattened body o About 1/2" inch long o Size of an apple seed o Shiny rusty red color o Small dark protruding eyes o Wingless o 6 legs, not longer than body o 2 antennae, not longer than legs o Accordion-like folds on body o Usually a dark area on its back o Swollen and larger after eating 	<ul style="list-style-type: none"> o Oval flattened body o About 1/20" - 1/10" inch long o Size of a poppy seed o Translucent tan color o Small dark protruding eyes o Wingless o 6 legs, not longer than body o 2 antennae, not longer than legs o Accordion-like folds on body o Usually a dark area on its back o Swollen and larger after eating o 5 molt stages 	<ul style="list-style-type: none"> o Elongated capsule shaped o About 1/32" inch long o Size of a grain of sugar o Seen with magnifying glass o Yellowish-white in color o Adhered to surfaces o Hatches in about 2 weeks o After hatching, the egg shells frequently remain on the surfaces

For more information on bed bugs and other control methods please visit <http://nyc.gov/health> or contact 311

NYC Department of Health & Mental Hygiene, 2001
<http://www.nyc.gov/html/doh/bedbugs/html/basics/bed-bug-id.shtml>



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Bed bug life cycle



Photo: John Obermeyer, Rutgers University

- Nymph to adult – must feed
- Poppy to apple-seed size
- 6-12 eggs laid @ 2-3 days – 400+ lifetime
 - o 1 mm long = 1/26", sticky
 - o Eggs pesticide resistant
- Nymphs hatch out in 6-10 days
 - o Must have blood meal to grow
 - o 30+ days to maturity
- 70% of infestation juveniles – small!
 - o Only adults have gender



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How do you control Bed Bug? Early detection!

- Education
 - Staff
 - Residents + Survey
- Inspection
 - Brief visual – no disassembly
 - Placement of monitors/interceptors
- Treatment
 - Encasements
 - Laundering
 - Vacuum & steaming
 - Dust & Dual-AI product (BUT: rotate class!)
- Re-inspect/re-treat
 - 14 day interval – at least twice
 - Until no further activity observed for 6 wks

Encasement

Interceptor
Installed...

After 2 weeks!...



(Cooper, 2015)



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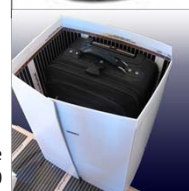
Treatment

Non-chemical

- Vacuum
- Steam
- Hot boxes; clothes dryer

Chemical

- Dusts – DE, silica gel, CimeXa
- Liquids – *PMP's only!*
- Biopesticide - Aprehend

HEPA Vacuum
= \$ 250Commercial
steamer = \$350ThermalStrike
heater = \$130

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Why do you choose your cleaning products?

- Habit
- Brand loyalty
- Cost
- Effectiveness
- Convenience
- Novelty
- ?Safety?



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Health Hazards of Cleaners, Sanitizers & Disinfectants

- The words “natural,” “nontoxic,” & “green” on product labels are unregulated by the government.
- Cleaning products do not have to list ingredients on the label & manufacturers do not have to prove they are safe before marketing them.
- Products labeled “green” may have as many toxic chemicals as conventional cleaning products.



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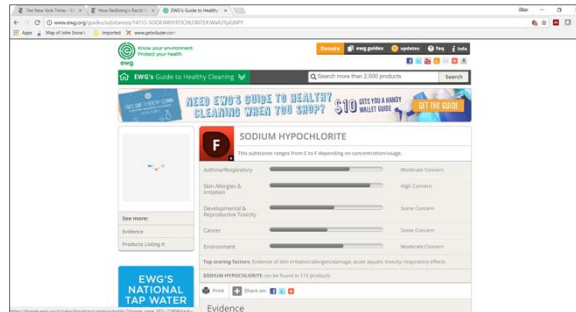
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Asthma and Asthmagens

Many cleaning, sanitizing, & disinfecting products can irritate the lungs and trigger or even cause asthma.

Common Asthmagens:

- Ammonia
- Bleach (respiratory irritant)
- Fragrance ingredients
- Certain disinfectant ingredients
- Volatile organic compounds (VOCs)



<https://www.ewg.org>



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For instance...

Fabuloso Multi-Purpose Cleaner Spray, Lavender

See: General Purpose Clea... Brand: Fabuloso Company: Colgate...

Asthma/Respiratory	Moderate Concern
Skin Allergies & Irritation	Some Concern
Developmental & Reproductive Toxicity	Some Concern
Cancer	High Concern
Environment	Some Concern

How does it rate: Scores for similar cleaners ranged from A to F. Search for a better General Purpose Cleaner.

Top Scoring Factors: May contain ingredients with potential for Government enforceable restrictions; cancer; respiratory effects.

2 Product Versions Ingredient Disclosure: poor Green Certified: NO Print



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Safer Choices

Cleaners & Air Fresheners

- ✓ Third Party Certified products
- ✓ “Caution” signal word
- ✓ Non-aerosol
- ✓ Fragrance-free & dye-free
- ✓ All ingredients listed on label
- ✓ No overwhelming odor
- ✓ Open the windows
- ✓ Exhaust to outdoors

*“Clean” does **not** have a scent to it.*



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Third Party Certification



- Many selections of institutional/industrial cleaning products.
- EPA “Safer Choice” for retail product – but not audited; allows fragrances.
- Some programs are forming buying clubs to purchase safer institutional products at better prices, or they’re purchasing through local schools



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Resources

- NPMA Best Management Practices
 - www.bedbugbmps.org
 - NPMA **Bed Bug Basics** Training: <http://pestworld.learningzen.com>
- BedBugCentral
 - <http://www.bedbugcentral.com/tv/preferred-pesticides-bed-bug-treatment>
- Dini Miller's Recommendations
 - <http://www.vdacs.virginia.gov/pesticides/bedbugs-facts.shtml>
 - www.epa.gov/pesticides/ppdc/bedbug-summit/2011/10-miller.pdf
- Early Detection for Multi-family Housing
 - <http://www.stoppests.org/ipm-training/training-opportunities/stoppests-webinars/taking-control-of-bed-bug-treatments/>
- Shelters & Group Living
 - http://www.nysipm.cornell.edu/publications/bb_guidelines/ and [Group Living Facilities](#)



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References

- Centers for Disease Control & Prevention (CDC)
 - www.cdc.gov
- PA Department of Health
 - http://www.health.pa.gov/My%20Health/School%20Health/Pages/Quick%20Links/Environmental/Pests.aspx#_WYs3gVGGNPY
- PA IPM Program
 - <http://extension.psu.edu/pests/ipm>
- Penn State Extension
 - <http://extension.psu.edu/pests/ipm/pestproblemsolver>
- Stop Pests in Housing
 - <http://www.stoppests.org/>





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Editor: Dion Lerman, MPH, ACE, HHS
 Amber Brunskill
 Lyn Garling
 Maria Gorgo-Gourovitch
 Michelle Niedermeier


Sources as noted on slides and in References

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Pennsylvania Integrated Pest Management Program
 Penn State Center • 675 Sansom Street • Philadelphia, PA • 19106 • 215-264-0582
dlerman@psu.edu • <http://extension.psu.edu/pests/ipm>




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Pennsylvania Integrated Pest Management Program

Dion Lerman, MPH
 Associate Certified Entomologist
 Healthy Homes Specialist
 Penn State Center
 675 Sansom Street
 Philadelphia PA 19106
215-264-0582
dlerman@psu.edu
<http://extension.psu.edu/pests/ipm>

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