

US EPA ARCHIVE DOCUMENT

# Educating to Reduce Failure in Bed Bug Control



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# Disclaimer:

Mention of any given brand name, product or technique is intended **ONLY** to cite an example, and is not an endorsement by the speaker, the AFPMB, or the DoD.

# Some Main Reasons Control Efforts Fail

1. Bed bug harborages NOT all found
2. Wrong identification (ID) - a different species  
(e.g., Bat bugs, another insect / arthropod )
3. Treatment NOT complete – (previous speaker)
  - a. Infested sites NOT accessible – Clutter / No access
  - b. Miscommunicated survey results (sites “missed”)
  - c. Error / inattention by person doing treatment
  - d. Equipment malfunction / Not properly calibrated

# Inspection ( Where might you find bed bugs?)

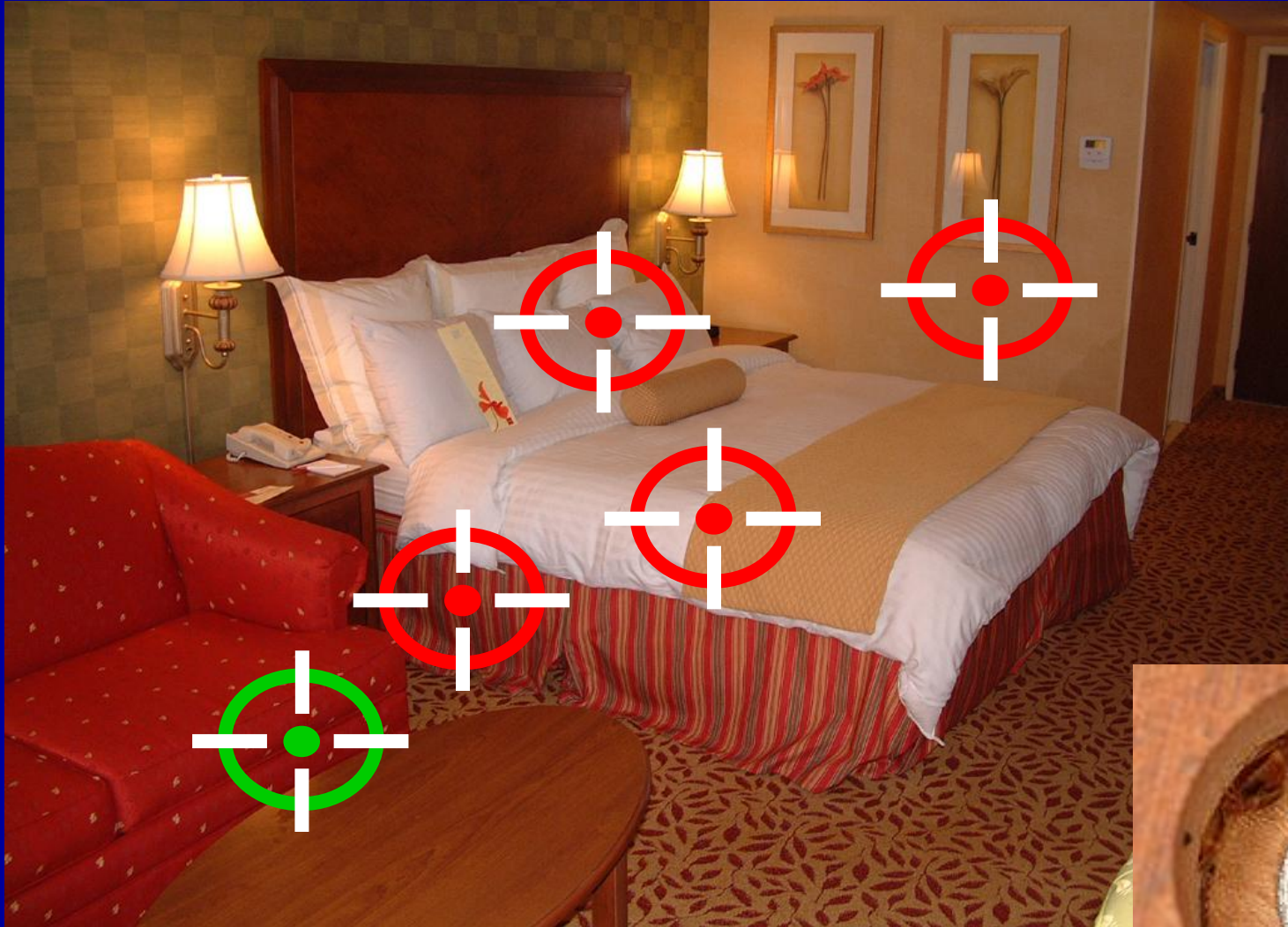


Photo above by: N. Spomer ▲

Photo at right by: M. Potter ►





# Upholstered Chair





# Upholstered Chairs (close up)



## Correct ID

**Bed Bug** (Common) vs. **Bat Bug** (Eastern)  
*C. lectularius* L. vs. *C. adjunctus* Barber





# Clutter



# Reasons Control Efforts Fail (Continued)

## 4. Treatment(s) NOT effective -

- a. Addressed in detail by **earlier speaker** (R. Cooper)
- b. MAY be due to chemical tolerance or resistance
- c. Some treatment techniques have **no residual** at all  
( including fumigation, heat, cold )
- d. Some chemicals ( **24-B**, esp.) kill ONLY on contact

## 5. No, or inadequate, follow-up monitoring and further control effort ( if needed )



# Treatment Complications

1. Some infested apartments, rooms,  
**or sites not accessible on schedule**
  - a. Inspectors, treatment teams denied access
  - b. Occupants not prepared (excess clutter)
  - c. Management representative sometimes  
not available w/ keys for secured areas

# Treatment Complications (continued)

2. Unexpected movements of people & things not told to inspector or treatment team
  - a. Regular social visits (other rooms / places)
  - b. Visits from family, friends from high risk sites
  - c. Periodic donations of second-hand furniture (by charities, friends)
  - d. Infested furniture carried out & left at curb
  - e. Service persons come in from high-risk sites



# Treatment Complications (continued)

3. Occupants sometimes move large items “out” before, then back “in” after, treatment  
(e.g., electronics, luggage, boxes of clothes)
4. Some occupants work in high-risk jobs or sites  
(e.g., long distance drivers, pilots, housekeepers )

# Infested Bedding at Trash Pick-Up Site



Photo by: B. Pannkuck



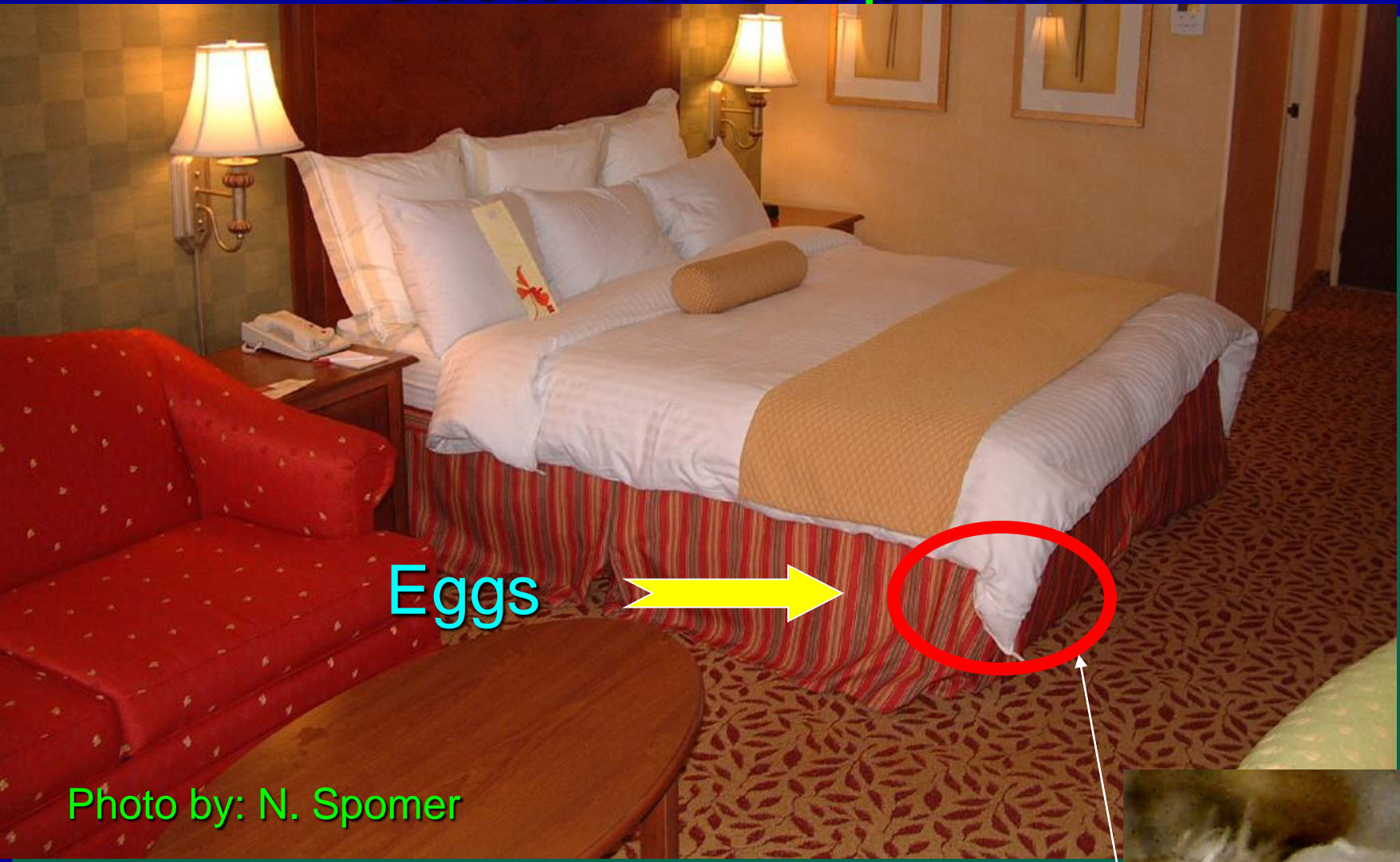
# Some Underlying Problems

1. Bed bug infestation still associated with being “unsanitary”
2. Many people over-react ( panic )
3. Many people still do not know much about bed bugs  
(what they look like, their behavior, biology, etc.)
4. People often do not know where to get good information / advice about bed bugs

## Underlying Problems (continued)

5. Many people do not know some  
    **specific actions to avoid**
  - a. moving furniture in & out without inspections
  - b. doing self-help with OTC chemicals
  - c. obstructing control by a licensed PMP
6. Managers should have a written plan  
    about specific process and actions to  
    deal with bed bug infestations
  - a. Inform all occupants
  - b. Consider consequences for non-cooperation

# Customer Cooperation



Eggs

Photo by: N. Spomer

Photo by: H. Harlan





# Education Tools for Victims, Mgrs., PMPs

- Handouts
- Direct explanations
- Meetings
- Web site links
- References
- Public Service Announcements
- Public Meetings with managers and technical (outreach) experts present



**Questions ?**

## A Few Suggested References (b.)

- Doggett, S., M. Geary, and R. Russell. 2004. The resurgence of bed bugs in Australia: With notes on their ecology and control. *Environ. Health*, 4(2): 30-38.
- Harlan, H., M. Faulde, and G. Baumann. 2008. Chap. 4. Bed Bugs, pp.131-151 [*In*] Public Health Significance of Urban Pests. [Bonney, X., H. Kampen, & K. Sweeney, (eds.)]. WHO Europe, Copenhagen, Denmark.
- Hwang, S., T. Svoboda, I. DeJong, K. Kabasele, and E. Gogosis. 2005. Bed Bug infestation in an urban environment. *Emerg. Inf. Dis.*, 11(4): 533-538 (Apr.)
- Jupp, P., R. Purcell, M. Shapiro, and J. Gerin. 1991. Attempts to transmit Hepatitis B virus to chimpanzees by arthropods. *S. Afr. Med. J.*, 79: 320-322.
- Potter, M. 2004. Your Guide to bed bugs. *PCT Mag.* Vol. 32(8). [A special 6-page "pull out" section between pages 12 and 13 of the Aug., 2004 issue].



# A Few Suggested References (a.)

Blow, J., M. Turell, A. Silverman, and E. Walker. 2001.

Stercorial shedding and transstadial transmission of Hepatitis B virus by common bed bugs (Hemiptera: Cimicidae). *J. Med. Entomol.* 38(5): 694-700.

Cabrera, B., and C. K. Heinsohn. 2006. Instant Symposium :

Not letting the bed bugs bite. *American Entomologist*.

52 (2): 98-121. [ Includes title article plus nine (9) more short articles as presented by other authors at the E.S.A. National Meetings in Ft. Lauderdale, FL; Dec., 2005. ]

Cooper, R. and H. Harlan. 2004. Chap. 8. Ectoparasites, Part three: Bed Bugs & Kissing Bugs. pp. 494-529, *In* 9<sup>th</sup> ed. *Mallis' Handbook of Pest Control*. S. Hedges (ed. dir.). GIE Publ, Inc., Cleveland, OH.

Doggett, S. 2006. A Code of Practice for the Control of Bed Bug Infestations in Australia. Australian Environmental Pest Managers Assn., Ltd., NSW, Australia. 54 pp.

See: [www.aepma.com.au](http://www.aepma.com.au)

# A Few Suggested References (Cont'd.)

- Snetsinger, R.** 1997. Chap. 9. Bed Bugs & Other Bugs. pp. 392-424, In 8<sup>th</sup> ed. Mallis' Handbook of Pest Control. S. Hedges (ed.). GIE Publ, Inc., Cleveland, OH.
- Technical Guide (TG) # 44.** 2007. Bed Bugs – Importance, Biology, and Control Strategies. AFPMB, [www.afpmb.org](http://www.afpmb.org).
- Usinger, R.** 1966. *Monograph of Cimicidae*. Thos. Say Foundation, Vol. VII, Entomol. Soc. Amer., Lanham, MD.
- WHO.** 1982. Vector Control Series. VI. Bed Bugs. World Health Organization. WHO/VBC/82.857. 9 pp.
- Zhu, F. J. Wigginton, A. Romero, A. Moore, K. Ferguson, R. Palli, M. Potter, K. Haynes, and S. Palli.** 2010. Widespread distribution of knockdown resistance mutations in the bed bug, *Cimex lectularius* (Hemiptera: Cimicidae), populations in the United States. Archiv. Ins. Biochem. Physiol. 73 (4): 245-257.

# A Few Suggested Web Sites

These sites can be “searched” for more details, images, *etc.* about Bed Bugs.

**Environmental Protection Agency (EPA) - Bed Bug page**

[http://epa.gov/oppfead1/cb/csb\\_page/updates/2010/bedbug-page.html](http://epa.gov/oppfead1/cb/csb_page/updates/2010/bedbug-page.html)

**Centers for Disease Control & Prevention (CDC) -**

<http://www.cdc.gov> - then search for “bed bugs”

**Armed Forces Pest Mgt. Board:** [www.afpmb.org](http://www.afpmb.org)

especially [Technical Guide # 44](#) ( and associated PPT™ )

**Michigan's Bed Bug Resource Website:**

[www.michigan.gov/bedbugs](http://www.michigan.gov/bedbugs) ( has ‘links’ to more sources )

**Connecticut Coalition Against Bed Bugs:**

<http://www.ct.gov/caes/cwp/view.asp?a=2826&q=437580&caesNav=|>