



Don't Let the Bedbugs Bite in YOUR Healthcare Facility

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Introduction

Before the pesticide DDT was banned due to its toxicity, bedbugs were fairly well considered as having been “wiped out” in developed nations. Since then, there has been a resurgence of these pests.

Are bedbugs playing hide and seek where you work?

Disclosure

Debra A. Cooper is employed by Coverys. She has no relevant financial relationships to disclose.

Objectives

- Discuss five identifying features of bedbugs
- List four preventive measures to avoid bedbug infestations
- Identify three measures that may be implemented to get rid of bedbug infestations

Personal Story

- History
- Situation
- Action
- Outcome



Professional Story

- Situation
- Actions
- Follow-up



Cause of Resurgence

- Unknown EXACT cause
- Pesticide resistance
- Mobile society
 - Domestic travel
 - International travel
- Decreased awareness/knowledge
- Decrease in state and local public health programs
- Seem to be EVERYWHERE

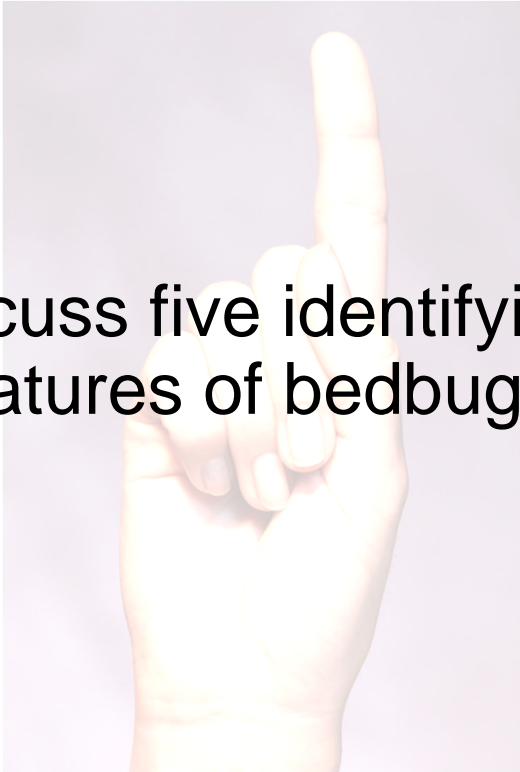


Source: U. S Environmental Protection Agency (EPA), "Introduction to Bed Bugs," Page last updated October 7, 2020, <https://www.epa.gov/bedbugs/introduction-bed-bugs>, 9/28/21.

Bedbug Myths

- Bedbugs can fly
- Bedbugs can jump
- Bedbugs are invisible
- Bedbugs prefer animals
- Bedbugs transmit diseases

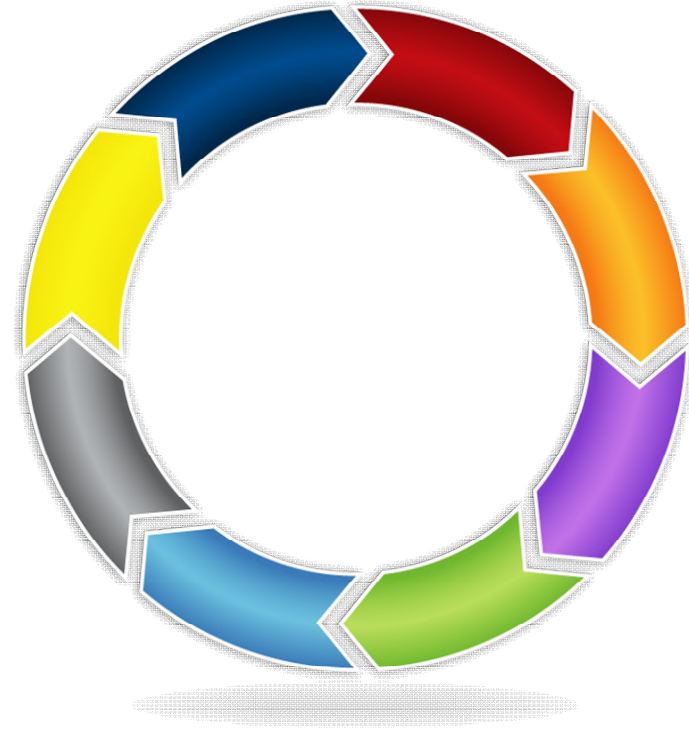
OBJECTIVE 1



Discuss five identifying features of bedbugs

Bedbug Biology

- Anatomy
- Life cycle



Anatomy of a Bedbug

Typical of any insect

Three body parts:

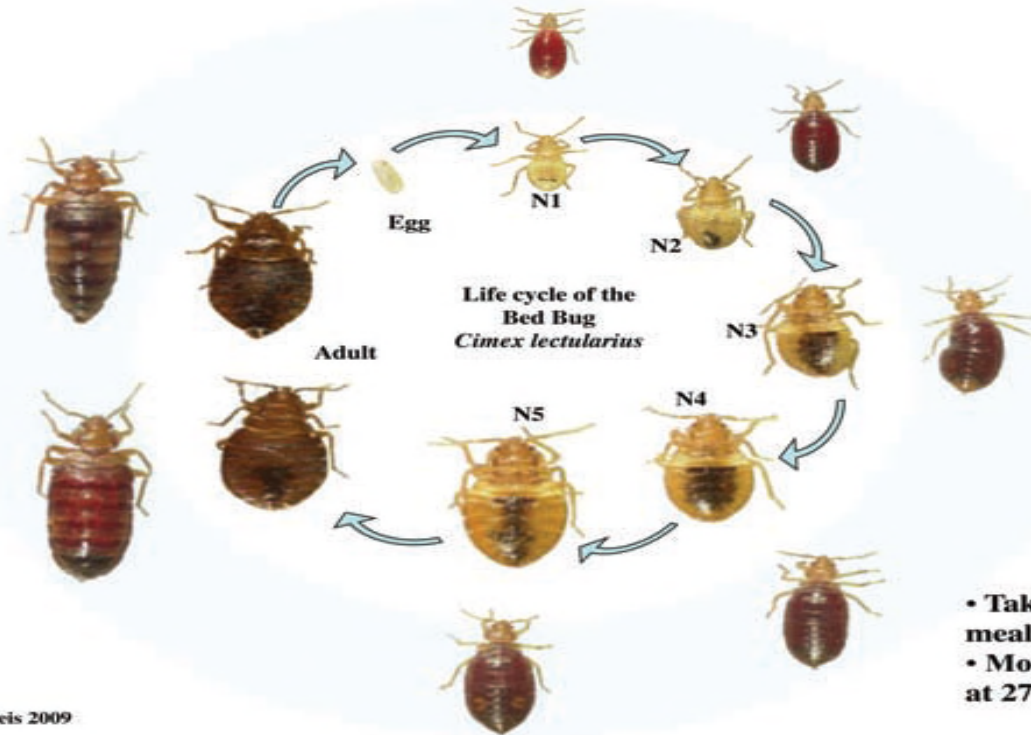
- Head
- Thorax
- Abdomen



Female (left) and Male (right) Adult Bed Bugs. Males are oval shaped. Females have a more pronounced oval shape. After a blood meal appearance differences disappear.

Photo Source: Bedbugs Handbook <https://www.bed-bugs-handbook.com/bed-bugs-pictures.html> , 9/28/21.

Life Cycle of a Bed Bug



M.D. Reis 2009

Source and Photo Source: Dini M. Miller and Andrea Polanco, "Bed Bug Biology and Behavior," n.d., <http://www.vdacs.virginia.gov/pdf/bb-biology1.pdf>, 9/28/21

Life Cycle Photo



Photo Source: Bedbugs Handbook <https://www.bed-bugs-handbook.com/bed-bugs-pictures.html>, 9/28/21.

Bed Bug

(*Cimex lectularius* Linnaeus)



Photo Source: "Bed Bug," Wikipedia, Page last modified Dec 20, 2021, http://en.wikipedia.org/wiki/Bed_bug, 9/28/21.

Bedbug (Side View)



Photo Source: Joseph Smith, University of Florida, "Common Name: Bed Bug," Featured Creatures, Published June 2000, http://entnemdept.ufl.edu/creatures/urban/bed_bug.htm. 9/28/21.

Actual Size (Adult)



Photo Source: Pinterest." 9/28/21

Mating Behavior

- “Traumatic insemination”
- Organ of Berlese
- Stabbing creates a wound
- Healing process impacts egg production
- Single mated female can cause an infestation
- Females will mate with offspring



Source and Photo Source: Dini M. Miller and Andrea Polanco, “Bed Bug Biology and Behavior,” n.d., <http://www.vdacs.virginia.gov/pdf/bb-biology1.pdf>, 9/28/21

Starting with the Egg



Enlarged Image of Bed Bug Eggs

Photo Source:1: Dini M. Miller and Andrea Polanco, "Bed Bug Biology and Behavior," n.d., <http://www.vdacs.virginia.gov/pdf/bb-biology1.pdf>, 9/28/21 Photo Source 2: <https://www.bed-bugs-handbook.com/bed-bug-photos.html> 9/28/21

Actual Size of a Bedbug Egg •

Difficult to see

- Egg under Lincoln's nose
- No known predator of eggs
- Can be destroyed by heat



Notice the Bed Bug egg under Lincoln's nose

Photo Source: Colorado Bed Bug K9, LLC, n.d., <http://www.bedbugbeagle.com/gallery/>, 9/28/21.

NYMPH (Bedbug “Baby”)

Eggs



“Hatching”



Photos Source: “Bed Bug Pictures,” The Bed Bug Handbook – Practical Tips and Advice, 2015, <http://www.bed-bugs-handbook.com/bed-bugs-pictures.html>, 9/28/21.

Newly Hatched: Unfed Nymph

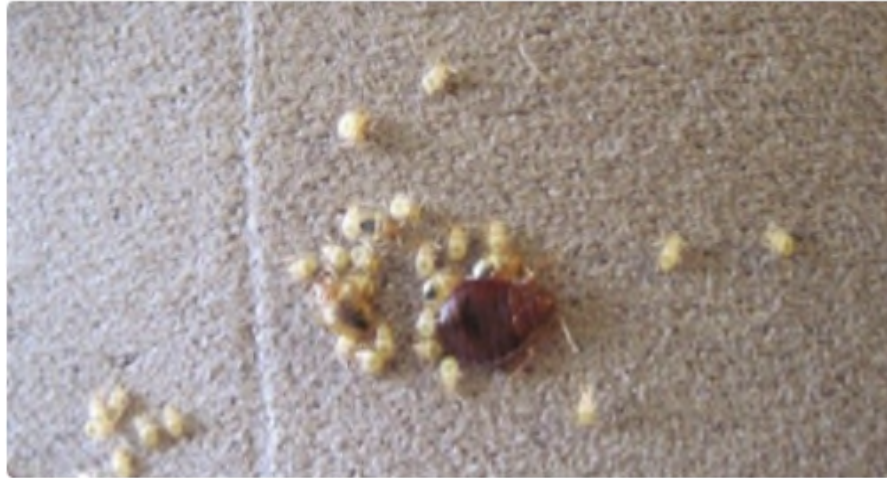


Photo Source: Bed Bug Lawyers. "What Do Baby Bed Bugs Look Like?," https://bedbuglawyer.org/baby-bed-bugs/#What_Do_Baby_Bed_Bugs_Look_Like, 9/28/21.

How Bedbugs “Feed”

Up-Close and Personal



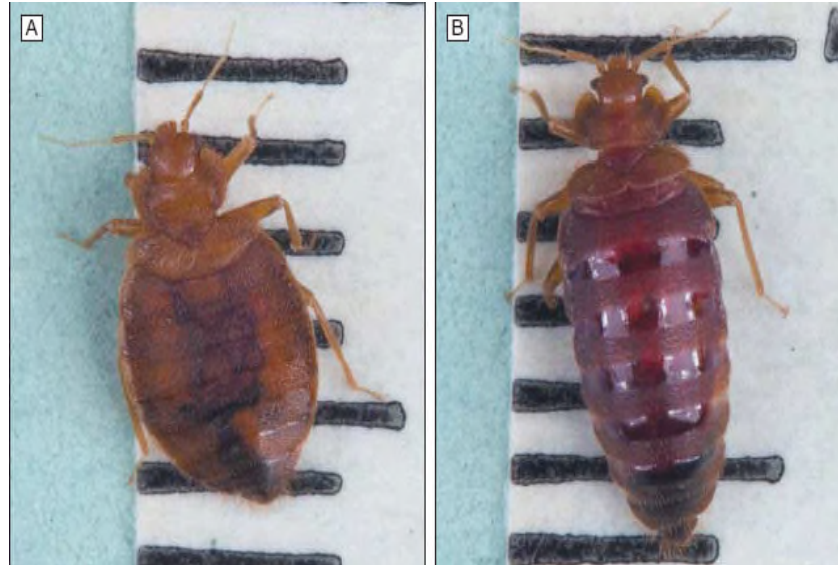
(Image credit: CDC/ Janice Haney Carr)

Photo Source: <https://www.livescience.com/19101-bedbug-microscope-images-album.html>. 9/28/21

Fed/Unfed

Engorged

Not Engorged



Photos Source: "Bed Bug Pictures," The Bed Bug Handbook – Practical Tips and Advice, 2016, <http://www.bed-bugs-handbook.com/bed-bugs-pictures.html>, 9/28/21.

Appearance of “Bites” Vary



Photo Source: Bed Bug Answers <http://www.bedbug-answers.com/bed-bug-bite-pictures.html>

Reactions to “Bites” Vary

- Time to react varies
- Variance can be contributed to worsening infestation



Top Photo Source: Bed Bug Answers <http://www.bedbug-answers.com/bed-bug-bite-pictures.html>
K9, LLC, n.d., <http://www.bedbugbeagle.com/gallery/>, 9/28/21

Bottom Photo Source: Colorado Bed Bug

Bite Characteristics

- Rows/clusters of bites
- May have a rash around them
- Could resemble hives
- Skin bumps
- Often red in color



Source: American Pest. "Signs of Bed Bugs". n.d. <https://www.americanpest.net/signs-of-bed-bugs. 9/28/21>. Photo Source: Medical News Today. 1/20/20. "Bed bug bites What you need to know". <https://www.medicalnewstoday.com/articles/318083#bites> 9/28/21

Houston We Have a Problem•

CLUES

- See live bugs
- See dead bugs
- See stains
 - Blood
 - Feces
- See casings
- See bites



Source: American Pest. Signs of Bed Bugs. n.d. <https://www.americanpest.net/signs-of-bed-bugs>. 9/28/21

Where DO Bedbugs Hide?

Bed Bug Hiding Spots

1. Mattresses
2. Box springs
3. Bed frames
4. Curtains
5. Edges of carpet
6. Corners inside dressers
7. Cracks in wallpaper
8. Upholstered furniture



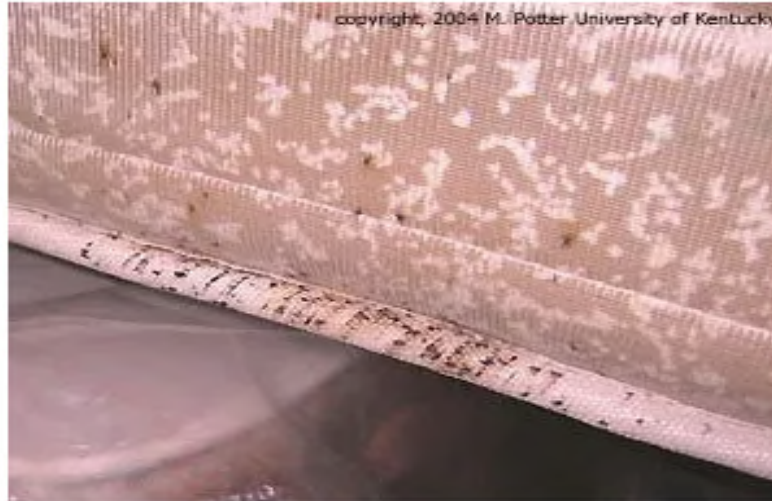
Photo Source: Medicine Net. Medically reviewed 4/2021. https://www.medicinenet.com/bed_bugs/article.htm , 9/28/21.

In Dressers



Photo Source: "Bed Bug," Wikipedia, Page last modified Dec 20, 2021, http://en.wikipedia.org/wiki/Bed_bug, 9/28/21

Mattresses



Bed Bug Fecal Stains on Mattress
Source: University of Kentucky

Photo Source: <https://www.bed-bugs-handbook.com/bed-bug-photos.html>. 9/28/21

In/On Clothing



Photo Source: Pest Seek: <https://pestseek.com/bed-bugs-on-clothes/>. 9/28/21

In Furniture Screws or Seams



Photos Source: Michael F. Potter, "Bed Bugs," University of Kentucky, College of Agriculture, Revised May 2012, <http://www.ca.uky.edu/entomology/entfacts/ef636.asp>, 9/28/21.

In Suitcases



Photo Source: "REPORT: Cincinnati Ranks #1 for Bed Bugs," Fox 19, Posted March 16, 2012, <http://www.fox19.com/story/17175264/cincinnati-ranks-1-for-bed-bugs-according-to-orkin>, 09/28/21.

Inside the Head of a Screw



Photo Source: Bed Bug Answers. n.d. <http://www.bedbug-answers.com/signs-of-bed-bugs.html>. 9/28/21

Behind Rubber Floor Moldings

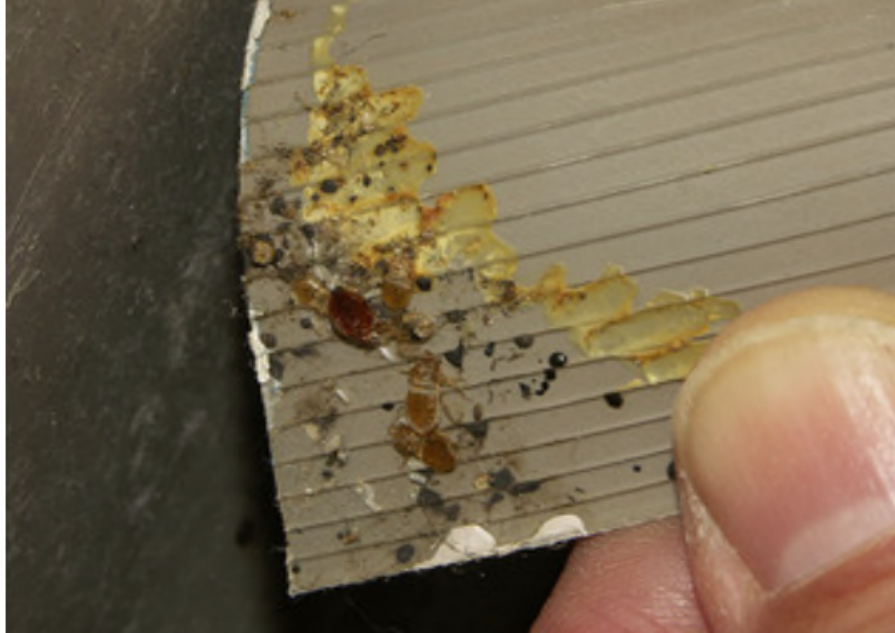


Photo Source: Bed Bug Answers. n.d. <http://www.bedbug-answers.com/signs-of-bed-bugs.html>. 9/28/21

On Door Hinges



Photo Source: Bed Bug Answers. n.d. <http://www.bedbug-answers.com/signs-of-bed-bugs.html>. 9/28/21

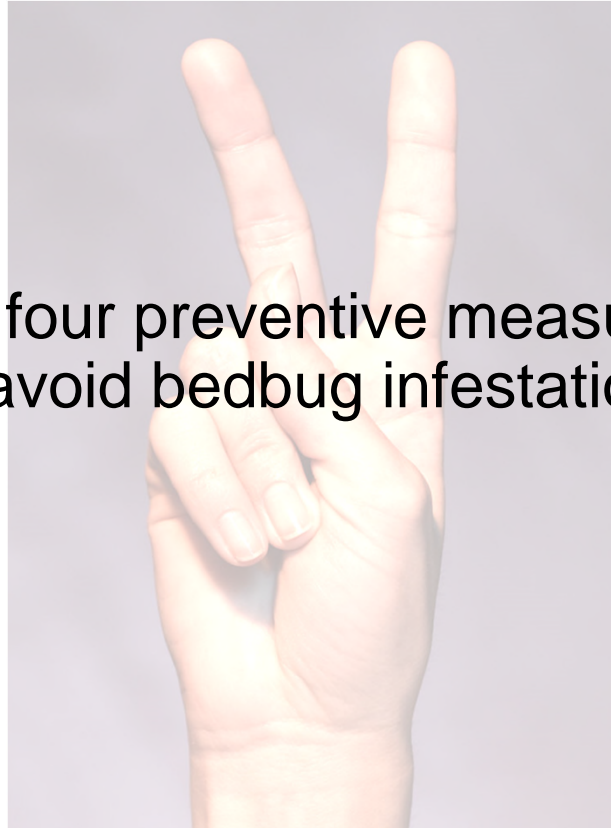
In Library Books



Photo Source: "Free Photos," All-free-download.com, 9/28/21.

OBJECTIVE 2:

List four preventive measures
to avoid bedbug infestations

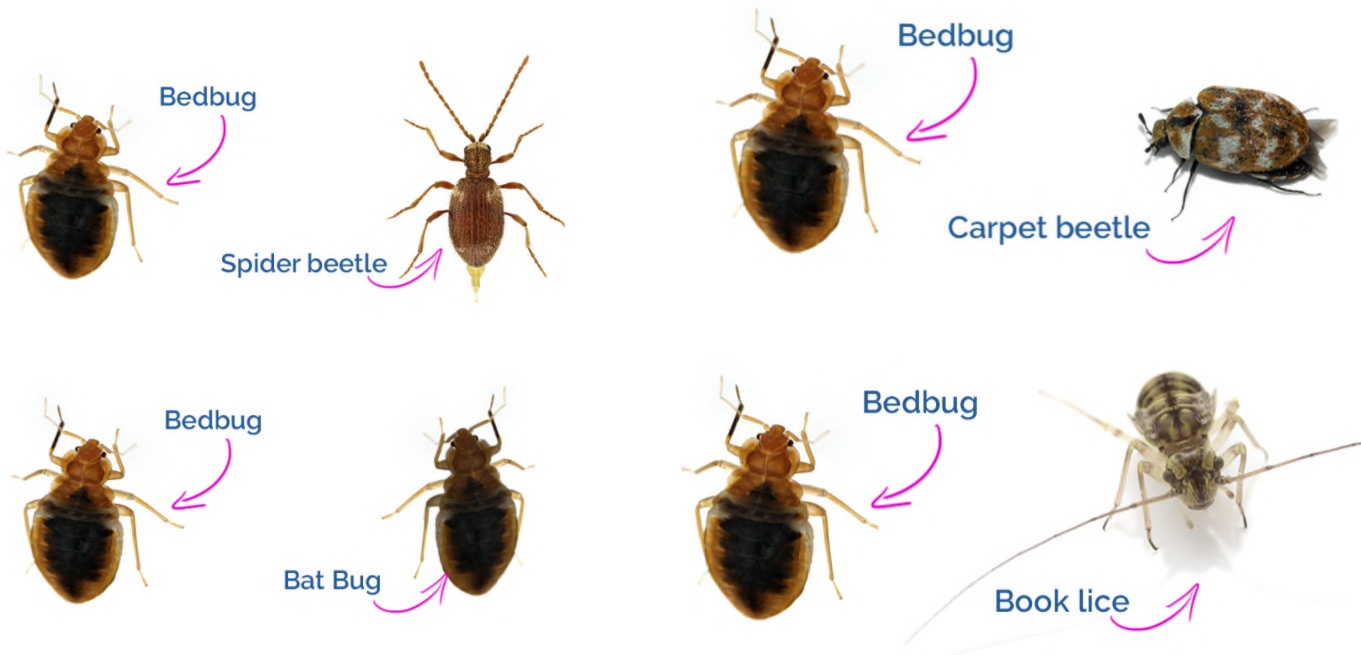


Identifying Infestations



Photo Source: Photo of Stephen Doggett by Woolter Peeters, In: "Invasion of the Body Snatchers," *The Sydney Morning Herald*, October 7, 2010, <http://www.smh.com.au/world/science/invasion-of-the-body-snatchers-20101006-167wa.html>, 9/28/21

Mistaken for Bedbugs



Source: Fantastic Services. "Common Bugs Mistaken for Bed Bugs" Update August 24, 2021
<https://fantasticservicesgroup.com.au/blog/bugs-mistaken-for-bed-bugs/>, 9/28/21.

Molted “Skin” Does Not Move •



Photo Source: Pest Seek. <https://pestseek.com/bed-bug-shells-skins-casings/>. 9/28/21

Full-Blown Infestation

Not a pretty sight!

- Lots of fecal staining
- May see exoskeletons
- May see un-hatched eggs



Photo Source: Medical News Today. 1/20/20. "Bed bug bites What you need to know". <https://www.medicalnewstoday.com/articles/318083#bites>
9/28/21

Other Clues of Infestation

- Odor
- Bites



Photo Source 1: Colorado Bed Bug K9, LLC, n.d., <http://www.bedbugbeagle.com/gallery/>, 9/28/21 Photo Source 2 Kenneth Greer, Visuals Unlimited, Getty Images, In: "Signs and Symptoms of Bedbug Bites," <http://www.webmd.com/skin-problems-and-treatments/picture-of-signs-symptoms-bedbug-bites>, 9/28/21

Impact of Bedbug Infestations

- Many negative consequences
 - Economic
 - Mental/physical health
 - Difficult to control/eradicate
- Allergic reactions
- Secondary infections
 - Impetigo
 - Ecthyma
 - Lymphangitis

Source: Centers for Disease Control and Prevention (CDC), "Joint Statement on Bed Bug Control in the United States from the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA)," https://portal.ct.gov/-/media/CAES/DOCUMENTS/Bed_Bugs/CIDS/JointStatementonBedBugControlintheUSpdf.pdf, 9/28/21

Patient with Hx of Bedbugs

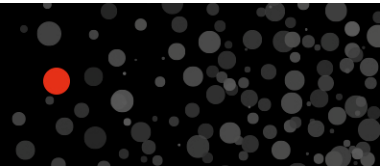
If the patient is coming in for a scheduled visit in an Ambulatory or Physician Office setting:

- Scheduling the appointment
- Prior to arrival, the patient should:
 - Put any clothes patient plans to wear to the setting (including coats/shoes) in a dryer for at least 15 minutes on HIGH heat
 - Immediately place these clothes in a plastic bag that is sealed to protect the contents
- Shower before coming to the facility
- Immediately after showering, put on the clothing and leave for the scheduled visit.
- Since it is possible that the patient's house is infested, patient should not sit on any furniture in the home, etc., to prevent the possibility of picking up a bedbug.

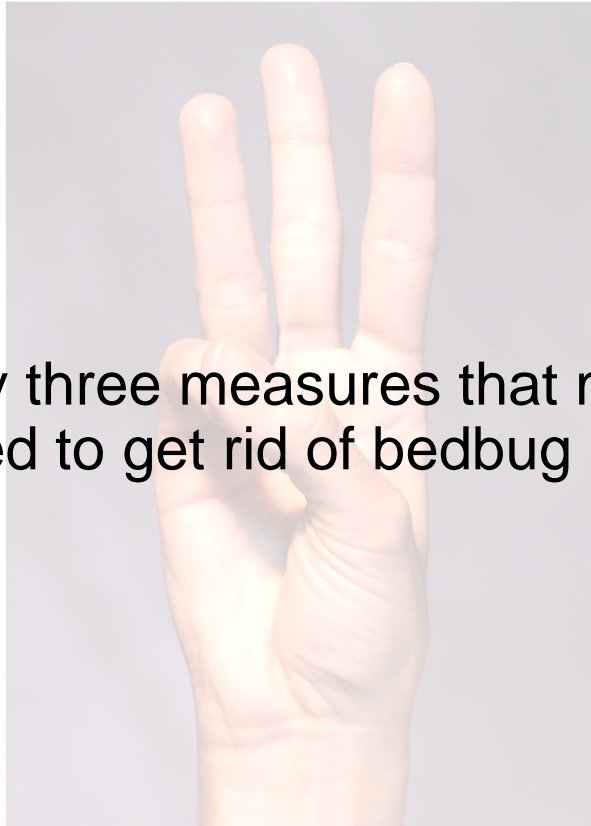
Patient Educational Material

- Bed Bug Fact Sheet <https://www.bsu.edu/-/media/www/departamentalcontent/facilities/pdf/bsu%20ehs%20bed%20bug%20handout%2092210.pdf>
- About bed bugs: <https://patient.info/skin-conditions/bedbugs-leaflet>
- FAQs about bed bugs from the CDC: <https://www.cdc.gov/parasites/bedbugs/faqs.htm>
!

OBJECTIVE 3



Identify three measures that may be implemented to get rid of bedbug infestations



Pest Control in Hospitals

- Know what to look for
- Educate/inform staff
- Properly identify the “bug”
- Avoid “second hand” items
- Seal cracks
- Develop a bedbug response plan



Biological Enemies of Bedbugs

Bedbug predators:

- Ants
- Spiders
- Mites
- Centipedes
- “Masked bedbug hunter”
- Pharaoh ant
- Rodents

Using a biological approach to rid human dwellings of bedbugs is impractical.

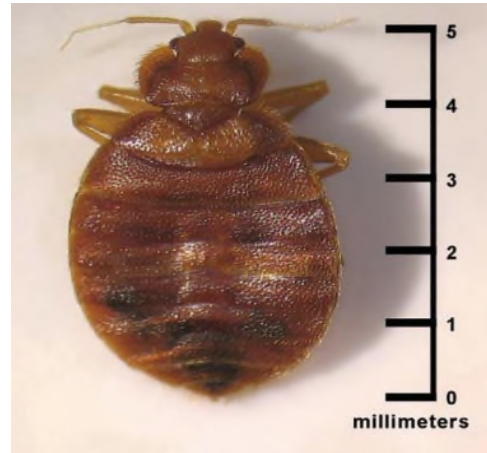


Photo Source: https://en.wikipedia.org/wiki/Bed_bug#/media/File:BedBugwithMeasure.jpg 9/28/21.

Getting Rid of Bedbugs

- **FIRST** you have to find them!
 - Look for clues
 - Trained dogs
- Minimally toxic pest control measures
 - Heat
 - Cold
- Frequent cleaning/sanitation “helps”



Can search with K9 Dogs



Picture Source: Colorado Bed Bug K9, LLC <http://www.bedbugbeagle.com/gallery>. 9/28/21

Prevention For YOU Personally

Acronym: *SLEEP*

Survey

Lift and look

Elevate

Examine

Place clothes in dryer



Source: "REPORT: Cincinnati Ranks #1 for Bed Bugs," Fox 19, Posted March 16, 2012, <http://www.fox19.com/story/17175264/cincinnati-ranks-1-for-bed-bugs-according-to-orkin>. 9/28/21

Sample Bedbug Report

Issue	Action	Comments/Outcomes
Suspicion of bed bug reported	A. Reported by: B. Date of report:	
Identity of "bug" confirmed	A. How confirmed: B. When confirmed:	
Initiation of bed bug response plan	A. Date of initiation: B. Staff notification:	
Plan of action developed	A. Date plan developed: B. Effectiveness of plan determined: C. Follow-up action(s): D. Final outcome reported to:	
Preventive measures implemented	A. Preventive measures: ○ _____ ○ _____ ○ _____	B. Effectiveness of preventive measures: ○ _____ ○ _____ ○ _____
Root cause analysis	Conducted (Y or N) If conducted, what were the end results (use separate page if necessary):	
Education Needs Identified	Identified education needs: ○ _____ ○ _____ ○ _____	
External Notifications	A. Patient(s) (specify in comments) B. Health Department (specify in comments) C. Other (specify in comments)	

Conclusion

- Bedbugs are back
- They hide pretty much anywhere
- Knowledge is power
- Exercise a high index of suspicion
- Prevention and fast action are key factors

Question and Answer Session

