INTRO TO MANAGING BED BUGS IN HOMELESS SHELTERS

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TODAY’S PROGRAM
- Welcome
- Intro to bed bugs
- Myths about bed bugs
- Biology of bed bugs
- Health issues
- Case studies
- Hands On exercises
- Developing a strategy for managing bed bugs in shelters
- Q&A and evaluation

INTRODUCTIONS
- Your Name and the Organization or Shelter you work for
- Your job role at the shelter
- What you hope to get from the training

MYTHS ABOUT BED BUGS
- Bed bugs are too small to see

ADULT BED BUG
- Range in size from size of pin head to apple seed
- Flattened, oval to pear-shaped body
- Reddish brown

MYTHS ABOUT BED BUGS
- Bed bugs weren’t a problem until they were brought from...
A LITTLE HISTORY...
BED BUGS IN WWII

WHY CURRENT INFESTATION?
- Current resurgence likely due to multiple factors
  - Increased international travel
  - Loss of older, effective insecticides
  - Resistance to newer pesticides

PYRETHROIDS AND DDT
- Initially, bed bugs well controlled with DDT (1940s), but resistance seen within 8 years of its use
- Today, resistance well-documented and widespread to DDT, pyrethroid insecticides
- Pyrethroids remain primary control cool for bed bugs among pest management professionals

MYTHS ABOUT BED BUGS
- You get rid of bed bugs by discarding infested mattresses

70% on bed
23% within 5 ft
7% Other harborages
MYTHS ABOUT BED BUGS

You can get rid of bed bugs by setting off foggers (the more the better)

FOGGER STUDY (OHIO STATE UNIVERSITY)
- Three retail foggers tested on fully exposed bbs
- 100% Susceptible bed bugs died
- Few resistant strain bugs died
- Foggers then tested on bbs with harborage
- Only 10-15% susceptible bugs died
- Few resistant strains died

MYTHS ABOUT BED BUGS

It’s best to wait until guests complain

PEOPLE AND BED BUG BITES
- Prefer feeding during darkness
- Bites painless
- More than 50% of people in multifamily housing with bed bug infestations will not report a problem
- Perhaps 1 in 20 people react obviously to bed bug bites

MYTHS ABOUT BED BUGS

Dirty, messy people get bed bugs

A LITTLE BED BUG BIOLOGY
**BED BUG LIFE CYCLE**

- Life cycle as short as 50 days
- Feed every 3-7 days
- Five nymphal life stages last 4-24 days each
- Adults live 3-12 months
- Females lay 3 to 5 eggs per day, up to 500 over lifetime.

**THE FEEDING PROCESS**

Photos by Whitney Cramshaw
Bed bug feet lack pads for smooth surfaces. Cockroach feet are adapted for smooth or rough surfaces.

Fecal spots on wood.
NOT BED BUGS

Brown banded cockroach nymph

Dermestid beetle larva

SOME FACTS ABOUT BED BUG BEHAVIOR

- Prefer darkness but will feed in daytime if necessary
- May travel 20 feet from hiding place to feed...even farther if necessary
- Seem to prefer humans over pets
- Can live for months without feeding
- Feeds from 3 to 12 minutes depending on age

BED BUG BITES

- Not all people react
- May bite multiple times
- Some people react severely

SLIGHT REACTION MOST COMMON

Early instar bed bug smashed on a piece of tape

Attracted to humans by body odor, body heat, carbon dioxide
- May hide in different locations each day
- Excellent hitchhikers in luggage, used furniture, bedding, clothing
- Adults and large nymphs may walk out door of one apartment and into another
- May enter adjoining rooms via wall voids or cracks in wall
BED BUGS AND INFECTION
- Blood sucking ectoparasites
- Like head lice
- BBs postulated in transmission of more than 40 human diseases—no scientific evidence that transmission has ever occurred (Goddard & deShazo 2009)

OTHER HEALTH EFFECTS
- Anemia in severe cases
- Secondary infections
  - Impetigo
  - Ecthyma
  - Lymphangitis
- Other pathogens?

DO BED BUGS CARRY MRSA?
- 3 homeless patients from Eastside Vancouver, BC hospitalized with bed bugs
  - Drug use and community-acquired MRSA common in area
- 5 bed bugs tested positive for drug-resistant organisms
  - MRSA and VRE (vancomycin-R Enterococcus faecium)
  - Not proved to actually transmit, but…

MENTAL HEALTH IMPACTS
- Anxiety and stress
- Insomnia
- Delusions of parasitosis

CASE STUDIES FROM OUR PROJECT

Kevin and Marcos chose the cold Chicago streets over bed bug-infested shelters last winter.
CASE STUDY A

- Shelter faced increasing complaints from residents over bed bugs
- Instituted screening, resident education at time of check-in, restricted personal items allowed in dorm
- Replacing wooden beds for metal beds
- Trying Kevlar® mattress covers
- Active and engaged shelter manager with high level of concern

CASE STUDY A

- Began monitoring bed bugs in dorm with approximately 40 beds
- Used four monitor systems
  - Climbup® interceptors
  - Blackout™ interceptors
  - BDS® sticky traps
  - Verifi® bed bug monitors

TRAPS USED

- Verifi, Climbup and BDS system

HOW A CLIMBUP TRAP WORKS

- Smooth, talcum powdered plastic unclimbable for bbs
- Bb drawn to bed climbs rough outside of cup, falls into moat

HOW A BDS TRAP WORKS

- Bed bugs wander up ramps
- Bed bugs caught in glue
- Textured base attractive to bed bugs

HOW A VERIFI WORKS

- Human scent and CO2
- Smooth vertical-wall pitfalls trap
- Textured harborage on back
- Slo-release odor and CO2 pac
BDS DETECTORS
- Placed on bed frame, floor, between mattress and box springs
- Sturdy design, easy to place
- Glue inside catches and holds bed bugs
- Caught fewest bed bugs

VERIFI STATIONS
- Placed on walls next to bed, between headboard and mattress, and on floor near bed
- Difficulty keeping stations in place and upright
- Highest rate of missing data

CLIMBUPS
- Catch bed bugs coming to or exiting bed
- Caught highest numbers of bed bugs in study
- Provide some protection to sleeper

CLIMBUPS
- Difficult to install in all corners of some beds, especially with clutter
- Difficult to install under bunk beds

CLIMBUPS
- Counting bed bugs is time consuming and involves need for handled and expertise in recognizing smaller life stages

UNEXPECTED ISSUES
- Disappearance and mysterious movement of interceptor traps
- Residents bought and added talcum powder to traps
- Pouring liquids in Climbups
- Important that everyone treated equally and educated about monitoring program

Talcum powder applied by resident to bed to discourage bed bugs
RESIDENT INGENUITY AND INTERFERENCE

POSTER AND CARD

CASE STUDY A
- Relied on pest control company to spot-treat monthly in response to complaints and our reports
- Chronic, low-level infestation remained throughout year: Bed bugs never eliminated
- At end of study
  - Moved all residents to other dorm space, vacating study area
  - Had pest control company spray all bed frames
  - Bought interceptor cups for every bed in dorm

CASE STUDY B
- Two older homes converted to shelters
- Mostly individual bedrooms with 3-8 beds per room
- Metal and wooden beds, wooden furniture
- No A/C in summer

CASE STUDY B
- Bed bug problem chronic and well established in most areas of homes
- Some beds with high populations
- Verifi stations caught high numbers in some traps
- Pest control done in-house, though little spraying attempted
CASE STUDY B

- Another use for Verifi cups—jewelry holder

Infested harborage on back of Verifi station

CASE STUDY B

- White painted furniture facilitated inspection
- Metal bed components also infested

CASE STUDY B

- Maintenance director chose to invest in heat treatment training and equipment

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CASE STUDY B

- Heat treatment resulted in some reduction in bed bug numbers
- Found that repeated and ongoing heat treatment was needed
- Heat is not a complete fix or permanent solution, especially in older wooden structures

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BREAK

Team members Drs. Charlie Helpert and Paul Nester take a break from counting bed bugs