

**Table 3.** Overview of Assessment Strategies for Selected Residential Hazards

| Residential Hazard  | Assessment Strategy |                 |                        |                |                              |
|---|---------------------|-----------------|------------------------|----------------|------------------------------|
|   | Visual Assessment   | Occupant Survey | Environmental Sampling |                | Building Performance Testing |
|   |                     |                 | Dust                   | Air            |                              |
| <b>Biological Hazards</b>   |                     |                 |                        |                |                              |
| Dust mite allergens   | X <sup>6</sup>      |                 | X <sup>1</sup>         | X              |                              |
| Cockroach allergens   | X <sup>6</sup>      | X               | X <sup>1</sup>         | X              |                              |
| Rodent allergens  | X <sup>6</sup>      |                 | X <sup>2</sup>         | X <sup>2</sup> |                              |
| Pet allergens   | X <sup>6</sup>      | X               | X <sup>2</sup>         | X <sup>2</sup> |                              |
| Mold  | X <sup>6</sup>      | X <sup>3</sup>  | X <sup>2</sup>         | X <sup>2</sup> |                              |
| Bacterial endotoxins  | X <sup>6</sup>      |                 | X                      | X              |                              |
| <b>Chemical Hazards</b>   |                     |                 |                        |                |                              |
| Pesticides  | X                   | X <sup>4</sup>  | X <sup>2</sup>         | X <sup>2</sup> |                              |
| Carbon monoxide   | X                   | X <sup>5</sup>  |                        | X              | X                            |
| VOCs, including formaldehyde                                      | X <sup>8</sup>      | X <sup>4</sup>  |                        | X              | X                            |
| Lead  |                     |                 | X                      |                |                              |
| Radon   |                     |                 |                        | X              |                              |
| Particulate Matter (e.g., PM <sub>2.5</sub> )                     |                     |                 |                        | X              |                              |
| NO <sub>2</sub>   |                     |                 |                        | X              |                              |
| <b>Structural Hazards</b>   |                     |                 |                        |                |                              |
| Structural defects  | X                   | X <sup>3</sup>  |                        |                |                              |
| Excess moisture   | X                   | X <sup>3</sup>  |                        |                | X <sup>7</sup>               |
| Poor ventilation  | X                   |                 |                        | X              | X                            |
| Unhygienic conditions   | X                   | X               |                        |                |                              |
| Carbon dioxide (CO <sub>2</sub> , fresh air indicator)            |                     |                 |                        | X              | X                            |
| Slip, trip, fall hazards  | X                   |                 |                        |                |                              |
| Un-cleanable surfaces   | X                   |                 |                        |                |                              |
| Missing/malfunctioning safety devices (e.g., smoke and CO alarms) | X                   | X               |                        |                |                              |
| <b>Behavioral Hazards</b>   |                     |                 |                        |                |                              |
| Cigarette smoking/2nd- & 3rd-hand smoke                           | X                   | X               |                        | X              |                              |
| Poor safety practices (e.g., no childproofing)                    | X                   | X               |                        |                |                              |
| Lack of supervision of children                                   |                     | X               |                        |                |                              |
| Unsafe use of products and appliances                             | X                   | X <sup>4</sup>  |                        |                |                              |

| Residential Hazard   | Assessment Strategy |                 |                        |     |                              |
|--|---------------------|-----------------|------------------------|-----|------------------------------|
|  | Visual Assessment   | Occupant Survey | Environmental Sampling |     | Building Performance Testing |
|  |                     |                 | Dust                   | Air |                              |
| Poor cleaning practices  | X                   | X               | X                      |     |                              |
| Toxic personal/consumer product choices  |                     | X <sup>4</sup>  |                        |     |                              |
| Poor ventilation practice (e.g., choose not to use kitchen or bathroom exhaust fans) |                     | X               |                        |     |                              |
| Other  |                     |                 |                        |     |                              |
| Lack of professional inspection (e.g., of gas appliances)                            |                     | X               |                        |     |                              |
| Lack of safety education   |                     | X               |                        |     |                              |

<sup>1</sup> Substance primarily found in settled dust; airborne with dust disturbance.

<sup>2</sup> Substance may be found in both settled dust and air.

<sup>3</sup> Occupant survey can provide information on historical events, e.g., past sewer backups, plumbing leaks, water intrusion and surface mold no longer apparent in a visual assessment.

<sup>4</sup> Survey regarding consumer product choices.

<sup>5</sup> Occupant survey can provide information on behavior that may influence CO levels, e.g., using a gas oven for heating or running a car in an attached garage.

<sup>6</sup> Although not visible to the naked eye, the presence of various allergens may be indicated through the visual assessment of living sources of the allergens (e.g., pets, rodents) or their detritus; or through observation of structural hazards that look for excess moisture (which invites dust mites, cockroaches, molds, and bacterial toxins), unhygienic conditions (in which cockroaches and rodents flourish), and structural defects (allowing entrance of cockroaches and pests), .

<sup>7</sup> Moisture meters can be used to detect the amount of moisture in walls and other solid surfaces.

<sup>8</sup> Although not visible to the naked eye, potential VOC hazards can be assessed during construction and renovation through observation of materials (e.g., low-VOC paints, adhesives, building materials, carpet, etc.).

Similarly, Public Health Seattle-King County (PHSKC) developed a "Home Environment Checklist" (HEC) that community health workers use to assess homes of asthmatic children (PHSKC 2009). They look for visual indications of asthma triggers and other hazards and use the information gleaned from the HEC, together with a caregiver health survey interview, to prepare a home-specific and child-specific asthma action plan.

Visual measures such as dampness, visible mold growth, signs of cockroach or rodent activity, the presence of pets, the presence

and condition of upholstery and carpets, the presence of sources of CO or volatile organic chemicals (VOCs), and general cleanliness, can all be used to identify particularly obvious sources of potential asthma exacerbation. Chew et al. (1998) evaluated the usefulness of a home characteristics questionnaire in predicting indoor allergen levels and found that although certain home characteristics (such as smooth versus carpeted floors) were significant predictors of increased allergen levels, home characteristics reporting was a relatively weak predictor of the absence of allergen. For example, in comparison to dust from smooth