

Protecting present and future generations - implementing lessons from the WHO/EURO book: *Public health significance of urban pests*



Chartered
Institute of
Environmental
Health

Graham Jukes and Jonathan Peck

Introduction

At the Fourth Ministerial Conference on Environment and Health in Budapest, Hungary, ministers of health and environment recognized that the existing housing stock, the lifestyles of our people, the immediate environment of dwellings and the social conditions of the inhabitants should all be considered when developing healthy and sustainable housing policies.

They also committed themselves to developing and strengthening housing policies that address the specific needs of the poor and the disadvantaged, especially with regard to children.

Following these commitments and working with the WHO European Centre for Environment and Health, the Chartered Institute of Environmental Health based in London suggested and co-funded the development of the book *Public health significance of urban pests* in 2001. The book, by Xavier Bonnefoy, Helge Kampen and Kevin Sweeney was published by the WHO Regional Office for Europe in 2008 and has since become a best-selling WHO publication.

Purpose of the book

The book contains a number of recommendations that would enable ministers responsible for public health and the environment to fulfill their commitments in an area of growing concern: namely the possible threat to public health that stems from urban pests and the attempts to control them.

It considers the significance of the main urban pests and the medical conditions they create, as well as the resulting economic cost of the burden of disease. It also proposes technical and policy options for governments that desire to implement adequate surveillance and contingency plans.

Each chapter of the book represents science-based and peer-reviewed contributions from international experts in the fields of pests, pest-borne diseases and pest management. Each contributor was specifically invited to participate by the WHO European Centre for Environment and Health, Bonn, who acted as secretariat for the working group.

Scope of this poster

The main purpose of this poster is to identify approaches to urban pest control that beneficially reduce the impact of pests on public health, particularly with regard to children.

Improved design and construction of our cities and our housing stock is certainly the most sustainable approach, for when pests lack the conditions they need to breed, such as food, drink, warmth and safe harbourages, they simply cannot survive.

However, the book shows that conditions often exist, where we live, work and play which enable health threatening pests not only to survive but also to thrive.

Unhealthy housing conditions

The physical and sanitary conditions of a dwelling greatly affect the likelihood of cockroach infestations, especially of German cockroaches. In fact, cockroaches typically rank as one of the most common and objectionable insects encountered by homeowners, especially in low-income housing.

In New York City, the frequency of cockroach sightings and allergens is related directly to the level of housing problems and level of disrepair (Rauh, Chew & Garfinkel, 2002). Indicators of disrepair include holes in ceilings or walls, peeling paint, water damage, leaking pipes and lack of gas or electricity in the past six months.

In a survey of 315 inner-city and low-income women in New York City, 66% of them reported seeing cockroaches (Whyatt et al., 2002). Greater than 75% of apartment tenants considered cockroaches a serious problem (Wood et al., 1981). In three cities in the eastern United States – Baltimore, Roanoke, and Norfolk – surveys of tenants of public housing indicated that 83% felt that cockroaches were a serious problem (Zungoli & Robinson, 1984).

A survey by Davies, Phil & Peltranovic (1986) of apartment residents in Toronto, Canada, indicated that about 50% of them had cockroach infestations, 89% considered them a health hazard and 94% considered them a source of anxiety.

In a household survey in Kentucky, 63% of the respondents listed seeing a cockroach as their tolerance threshold. Less than 10% of the respondents would tolerate seeing more than five cockroaches (Potter & Bessin, 1998).

The incidence of cockroaches in commercial food-handling establishments exceeds 50%. In New York City, 53% of the 18 000 food establishments inspected in 1976 had insect infestations (Dupree, 1977).

In a random survey of 100 commercial food-handling establishments in Los Angeles, 62 were infested with German cockroaches. All of them had professional pest control service (Rust & Reiersen, 1991). It is likely that as many as 70% of all food-handling establishments have cockroach infestations.

Cockroaches as a health hazard

Cockroaches present a potential health problem to people and their companion animals. Brenner (1995) and Baumholtz and colleagues (1997) have provided extensive reviews of literature on the pathogens associated with cockroaches, including such pathogens as viruses, bacteria, fungi and molds.

Fathpour, Emtiazi & Ghasemi (2003) collected German, American and brownbanded cockroaches from hospitals, houses and poultry sheds in Iran. Of the 80 cockroaches tested, about 70% were contaminated with *Salmonella* spp., many of which were resistant to antibacterial drugs.

Even though numerous studies have demonstrated the ability of cockroaches to pick up and later excrete or transfer pathogens, definitive evidence that cockroaches are vectors for human disease is still lacking.

However, the prevalence of cockroaches near human and animal wastes, human food, and human environments creates sufficient concern about their role as vectors. This potential health threat necessitates the control of cockroaches in food handling areas, hospitals and human residences.

In addition to the disrepair and poor sanitary conditions associated with poverty that promote cockroach infestations, inner-city children are exposed to heavy applications of pesticides (Landrigan et al., 1999).

The quality of the indoor environment is especially important because 75% of children between the ages of 5 and 18 years spend 16 hours or more in the home (Bonnefoy et al., 2003). Consequently, conditions that contribute to cockroach infestations and control measures to eradicate them will greatly impact children living under conditions of poverty.

Allergies and asthma

Asthma is a major urban disease and a substantial burden on both the quality of life for those who suffer from the disease and the economics of health care. It is an allergic disease for more than 50% of adults and 80% of children (WHO, 2003).

In an urban environment, sensitization to pests, including rodents, cockroaches and dust mites, is common among asthmatics.

In the United States, the National Cooperative Inner-City Asthma Study (NCICAS) found that 77% of mild or moderate asthmatics 4–9 years of age were sensitized to at least one of the allergens tested, including a high prevalence of sensitization to cockroach and mouse allergens (Kattan et al., 1997).

A similar study in Atlanta, Georgia, found that 80% of mild or moderate asthmatic children had a positive allergy skin test to at least one allergen, primarily from cockroaches and dust mites (Carter et al., 2001).

Recently a study from inner-city New York City found sensitization to mice, cockroaches and dust mites was common (about 15%) in children as young as 2 years old (Miller et al., 2001a). However, rates of sensitization to both dust mites and cockroaches vary between cities and ethnic groups within cities (Stevenson et al., 2001).

A study of inner-city asthmatic children from several cities in the United States found that those asthmatic children who were sensitized to cockroaches and exposed to higher levels of cockroach allergen in the home had more frequent asthma symptoms and hospital admissions for asthma (Rosenstreich et al., 1997).

Findings from several studies show that the prevalence of childhood asthma in an urban population could range from 8% to 22% and that the prevalence of allergy among asthmatic children varies by community (50–80%) (Martinez et al., 1995; Kattan et al., 1997; Ronmark et al., 1999; Lau et al., 2000; Carter et al., 2001).

Among these atopic children in an urban environment, many are allergic to urban pest allergens that can exacerbate symptoms (Rosenstreich et al., 1997). Therefore, exposure to urban pests could affect 4–17% (for example, from 50% of 8% to 77% of 22%) of children living in an urban environment.

Another study in North America found that for every US dollar spent, asthma disease management has been shown to save US\$ 3–4, by decreasing visits to emergency departments (Rossiter et al., 2000). Overall, the long-term economic and quality-of-life benefits of decreasing the number of missed school and work days are difficult to assess, but they are surely positive.



Recommendations

The book lists a number of recommendations.

Planning and construction

By destroying the borders between urban and rural environments, urban sprawl makes urban areas more susceptible to pests and the disease agents they carry. Since many zoonotic pathogens are more likely to be transmitted between vectors and their reservoir hosts in rural environments, the risk of infection increases as rural amenities, such as woodland and recreational areas, are promoted.

This risk could be reduced by:

- 1 regulations about city planning, landscaping, design of recreational areas and the like taking into account the risks of pest infestation and disease transmission; and
- 2 construction regulations ensuring that new buildings are pest-proofed and do not create conditions conducive to pest infestation.

Responsibilities

Because pest management involves health, environmental and occupational factors, it is often difficult to decide which government department or agency should be responsible for its activities. At the local level, it is often unclear which body is responsible for pest prevention, surveillance and control.

The following approach may help resolve the difficulty in decision-making and the lack of clarity.

- 3 A single government department should have the ultimate responsibility for supervising monitoring programmes and implementing pest management measures; this should be accompanied by the political will to implement programmes and measures.
- 4 With regard to pest management, adequate regulations should make clear the liabilities of contractors, building managers, homeowners, apartment occupants and local authorities.

Pesticide application

Potent pesticide products are often not only available to private individuals, but are also often misused by them, due to a lack of knowledge or expertise. In this case, pesticides may be applied when unnecessary, in wrong formulations, at wrong concentrations and in wrong amounts.

Even if used correctly, pesticides still hold a risk for both human health and environmental health. They therefore require a technical risk–benefit analysis before being applied. The following measures may help improve this situation.

- 5 Although regulations that cover the sale and use of pesticides exist throughout Europe and North America, a stricter differentiation between professional and amateur products should be established and enforced, to prevent the general public from having access to products that need to be used only by trained and competent operators.
- 6 Through scientifically based risk assessments and proper approval processes, pesticide applications and the pesticides used should not pose an unacceptable risk to consumers, operators or the environment. Proper risk assessments should be required and carried out before pesticides are put on the market.

“Health is a state of complete physical, mental and social wellbeing, not merely the absence of disease or infirmity”

The World Health Organization definition

For further details about the book and the above references contact npap@cieh.org

To download a copy of *Public health significance of urban pests* or the CIEH summary go to www.urbanpestsbook.com