

THE PEST MANAGEMENT INDUSTRY — WHERE IS IT GOING IN THE 21ST CENTURY?

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Abstract When the fathers of public health were establishing the environmental health industry in the 19th century, there were five main problems facing them: poor housing conditions; inadequate pest control; a lack of proper drainage; polluted air quality; and an unwholesome supply of water. Today we have primarily solved the problems of drainage, air quality and water supply but there are still many areas, even among the developed nations, where housing conditions are substandard and pests continue to present a threat to human health. As we move into the 21st century, the environmental health industry is facing a number of new challenges which we need urgently to resolve. These include the adverse effects of climate change, emerging diseases, urban sprawl and increasing world travel. In resolving these problems, we must be fully aware of the need to protect the environment and non-target species, as well as making sure that consumer concerns about the toxicity of the products that we use are fully addressed. The presentation considers the effects that the new problems are having on public health, and what we need to do resolve them and to prove how responsible our industry can be in meeting these challenges.

Key Words Environmental health, pest control industry human health, pests

INTRODUCTION

When in the 19th century, the fathers of environmental health were campaigning for better public health there were five main problems facing them. These problems were the: 1) appalling housing conditions in which people were living; 2) constant threat to health from commensal pests; 3) lack of proper drainage and sewage systems; 4) polluted air quality in the increasingly industrialised cities; and 5) lack of a clean water supply.

The extent of the problems and the effect they had on society can be judged by the fact that in 1842 in Manchester, a city at the heart of the industrial revolution for example, a professional person had a life expectancy of 38 years, whereas that of a worker was only 17 years. Even in Rutland, a rural area in central England, life expectancy for a member of the professional class was only 52 and 38 for a farm laborer. During the late 19th and 20th century, as Governments embarked on social reform programs and established a legislative framework to improve environmental health, public health conditions changed dramatically. As a result, today, we are able to take drainage and sewage for granted; most people have ready access to good quality water; and the legislation has delivered clean air, even in major industrial cities.

We do still have serious problems with our housing stock and the same pests that caused our Victorian ancestors so many problems are causing us problems today. The reason for this cannot be that the pest management industry is unable to control the pests. The products and techniques needed for their successful treatment certainly exist. There is no shortage of pest controllers either privately or publicly employed, who can achieve the level of control needed. The most logical reason therefore is the lack of political will. Generally speaking before the mid-19th century, Governments did not see it was their role to control the activities of employers or landlords by passing social legislation. Nor did they see this as an appropriate use of Government funds.

However, in the following 130 years, Governments increasingly took responsibility for health, education and social improvements and a raft of social legislation was introduced on environmental matters, such as water and air quality, which has resulted in the advances from which we now benefit. At the same time, billions of dollars, pounds and euros have been spent on environmental projects, such as laying new drains

and sewers and providing safe drinking water. Unfortunately, during the last 20 years, local and national governments have again withdrawn from general funding of many of the projects which would improve environmental health, instead preferring to switch the liability onto industry or local communities to fund many necessary projects. An example of this in the United Kingdom is the present move to raise money for environmental health budgets by allowing local authorities to charge for pest control services. It is clear from work carried out at Warwick University that there is no standard charging system being used and local authorities are setting their charges without any proper basis of assessment.

Reports indicate that the introduction of this charging is having a serious effect on the level of rodent control being carried out. An English Member of Parliament last year stated that local authorities were spending £150 m a year on removing chewing gum from our streets. If this is so, then they are spending some three to four times more on chewing gum removal than protecting local communities from pests. At the same time, public funding for pest management projects is becoming increasingly difficult to secure. This is especially true of funding for monitoring or research projects. So what are the challenges facing the industry?

URBAN SPRAWL

This is the term used when new developments of housing, commercial properties or retail parks are built on the outskirts of towns causing it to spread or ‘sprawl’ into the countryside. Apart from the adverse effects caused by the increased use of cars leading to greater traffic pollution and to higher obesity rates, urban sprawl can have serious effects on pest management problems. For example, in 2007, a group of local authorities in the West of England carried out an analysis of why there were increasing rat infestations in domestic premises in their districts between 1st January and 30 June in that year. Some 6,474 call outs were analyzed and a reason found for the infestation. The analysis showed that the greatest cause (27.6%) was the presence of food put out to feed birds in gardens and the second most common cause (14%) was rats living in compost bins. Poor housing standards in the form of broken and defective drains (9.7%) was only the third most common cause. The fourth most common cause was the keeping of domestic animals and birds.

Analyzing the figures by group shows that behavior of the residents was responsible for 55.4% of problems; location, such as proximity to agricultural land, river banks and derelict buildings was responsible for 20.4%; and poor building maintenance was responsible for only 16.1%. 8.1% was unqualified. The significance of this is that rat infestations may well become a greater problem in future in affluent suburban areas, where bird feeding in gardens, compost bins and the keeping of animals are likely to be more common. In contrast, many former inner city degraded areas are being redeveloped into desirable “warehouse living” apartments and restaurants and these areas are now kept free of rodents by environmental improvements and harborage changes.

It is unlikely that local authorities have appreciated the connection between town planning and pest infestations and made allowance for it either in their approvals or in their budgets. Apart from the changes to the type and locations of infestations, there are considerable problems posed by building developments during construction. If the drains and sewers are not capped before construction starts, rodents will be able to escape from the drainage system and infest local neighborhoods. In addition, some building sites create water-filled sumps which provide ideal mosquito breeding sites. It is regrettable if building permits do not consider pest management requirements.

HOUSING CONDITIONS

Because there is a connection between the environment in which we live and our state of health, the presence of rodents, insects, ticks and pest birds can create a major health hazard. Sometimes this is as an inevitable result of local features, such as mosquitoes breeding in ponds or swamps; rats living in sewers; flies from pig or poultry farms near new housing estates; or birds seeking food in city centers. However, more and more the problem is caused by the behavior of people and the conditions that they themselves create. The problem may also result in the creation of a medical condition rather than a transmitted disease.

In 2002, the World Health Organization carried out a major investigation into health and housing in 8 European Union cities, Angers, Bonn, Bratislava, Ferreira, Forli, Geneva and Vilnius, together with Osh in Kirghistan. Altogether, 3800 households were surveyed covering 8400 inhabitants. The purpose was to

ascertain the connection between housing conditions and health. The investigation, known as the LARES survey, involved an initial questionnaire, followed by a personal interview and inspection of the premises. The data collected was analyzed according to allergy, respiratory disease, obesity, mental health, quality of life, noise, sociology and psychology conditions. The survey showed that: 1) six dwellings in ten were or had been infested during the previous year; 2) the primary pests were ants, flies, cockroaches, mice, mites, bedbugs, rats, fleas, and mosquitoes; 3) people living in pest infested premises were more likely to suffer from depression, chronic allergies, chronic migraine and asthma (Table 1). When pest control was carried out by local residents, they were more likely to suffer from allergies, wheezing, sneezing, headaches and watery eyes. This is especially true for young people (Table 2).

Table 1. Connection between infested housing conditions and human health conditions.

Conditions and Health Problems	Value (95% Confidence interval)
WHEN MICE ARE PRESENT IN HOUSE	
<i>Trends of depression</i>	2.21 (1.3-3.75)
<i>Migraine and frequent headache</i>	1.97 (1.17-3.34)
WHEN MICE ARE PRESENT IN FLAT	
<i>Migraine and frequent headache</i>	8.06 (4.05-16.04)
WHEN COCKROACHES PRESENT IN HOUSE	
<i>Migraine and frequent headache</i>	3.26 (1.78-5.96)
MITES PRESENT IN HOUSE	
<i>Asthma — diagnosed by physician</i>	2.33 (1.01-5.41)
<i>Asthma — taking prescribed medicine</i>	2.39 (1.03-5.53)
FLIES PRESENT IN HOUSE	
<i>Asthma — diagnosed by physician</i>	1.73 (1.03-2.90)

The odds ratio shows how many times more likely a person is to suffer from a condition. For example a person living in a dwelling where mice are present are 2.21 times more likely to suffer from depression than someone whose dwelling is mouse-free, and over eight times more likely to suffer from migraine or frequent headaches if the dwelling is an apartment. This is not to say that pests cause depression or migraine, although they do cause allergies. It suggests that living in pest infested housing causes depression and results in migraine.

Table 2. Connection between use of insecticidal spray or contact poison and health conditions in general population, and people 20 years of age or younger*.

Health Problems	Value (95% Confidence interval)
Allergies = 1- 5 allergies	1.17 (1.06-1.30)
Wheezing in chest	1.27 (1.10-1.47)
Sneezing, runny, blocked nose	1.14 (1.03-1.26)
Headache	1.39 (1.26-1.53)
Watery eyes	1.30 (1.15-1.48)
*Sneezing, runny, or blocked nose	1.38 (1.05-1.83)
*Headache	2.02 (1.16-3.53)

* People 20 years of age or younger

CLIMATE CHANGE

There is increasing concern because climate change is expected also to bring about a change in the pattern and ecology of public health pests. Some of the problems will be a direct result of the expected changes. For example, while it will not fully explain the reported increase in rat populations, climate change will provide a significant extra factor to the problem because warmer winters and wetter summers will provide ideal conditions for rodent populations to multiply. Other pests are also likely to become a greater problem. Northern Europe has always had a significant mosquito population but the lack of reservoirs of disease has meant that the problems that they have caused have been largely a nuisance. However, we should remember that climate change could mean that diseases previously considered as tropical could now be found in more temperate regions. Chikungunya fever has previously been a disease of Africa and Asia but the recent outbreak in Italy has been a worrying development.

A presentation at the 4th European Mosquito Control Association in 2007 showed that where average temperatures rose, mosquito populations could breed twice as fast, meaning that even existing infested areas could be adversely affected by climate change. We should also remember that the World Health Organization defines health as ‘...a state of complete physical, mental and social wellbeing, not merely the absence of disease or infirmity.’ This means that a nuisance pest can be just as much a threat to health as a disease bearing pest. Other problems will be more indirect. For example, warmer temperatures will result in people changing their recreational habits. The spread of West Nile virus in the United States was assisted by the habit of Americans enjoying barbeque parties in their back yards and the spread of Lyme borreliosis is assisted by people out walking in forests and on heathland wearing only minimal clothing.

EMERGING DISEASES

The increase in global travel will almost certainly pose a greater threat of diseases being transported across continental boundaries. Travel times from Africa, Asia and South America to North America and Europe are now so short that passengers carrying disease will be home before the symptoms appear. This will make it more difficult to contain emerging diseases at source. At the same time, holiday makers are increasingly choosing “long haul” destinations for their annual vacations. Many of these new holiday areas are in regions where malaria and dengue are rife, such as Central America, central Africa, the Indian sub-continent, Thailand and Malaysia.

Some diseases, such as toxoplasmosis, are already present in many communities and are expected to become more significant in future as we understand better the threat that they pose. In the UK, recent research carried out at Salford University has shown that over 50% of mice in the UK carry toxoplasmosis. If a disease becomes reservoirised in a community, it could be spread by vectors. The West Nile virus outbreak in the United States, which is still causing problems in that country, is a classic case of how swiftly and totally an emerging disease can spread in even a well developed country with a strong medical tradition. However, few physicians will have received adequate training in medical entomology which would enable them to spot problems in time.

Other emerging diseases will cause indirect problems. Neither Avian flu nor Foot and Mouth are considered to be diseases particularly relevant to the pest control industry. However, when an outbreak is confirmed, all the animals are destroyed and the buildings are emptied of manure and food before being disinfected. Without a ready food source, the rats that are inevitably present on all farms will migrate to neighboring housing and commercial properties. Rarely, if ever, will any rodent control be carried out on the farms before the outbreak is treated. Too often the people responsible for treatments will not have a good enough understanding of pest management needs or techniques to realize which simple precautions can prevent basic problems from arising.

ENVIRONMENTAL CONCERNS

There is no doubt that we need to control pests and manage environments so that pest problems will not arise. However, we must always ensure that we do not replace one problem with another. The Biocidal Products Directive in Europe and similar new requirements for better data in other areas of the world are ensuring that only pesticides that have met very rigorous safety and efficacy standards are allowed on the market. The

new parameters on use which are laid down as part of this assessment process are also ensuring that new and better techniques are being developed in their application. However, the industry will need to consider more closely the effects that pesticides are likely to have on the environment and especially wildlife and environmental assessments will become more demanding as the question of secondary poisoning of non-target species is better understood.

Typical environmental questions that will need to be asked before a treatment is carried out may include: 1) Is the treatment near a protected area? 2) Which protected species may be present in or near the treatment site? 3) What alternative environmental measures would be appropriate? 4) What are the risks to non-target species and how to mitigate them? 5) What is the treatment designed to achieve and how will success be measured? 6) What is expected from the client and what follow-up measures are required?

If the industry is to demonstrate maximum responsibility, it is likely that much greater documentation will be required in future to show that these types of assessments have been carried out.

THE WAY FORWARD

In 2002, the Chartered Institute of Environmental Health commissioned a book to be written by the World Health Organization. The purpose was to consider the public health significance of urban pests. During the preparation of the book, certain conclusions were reached. These are as follows: 1) Regulations regarding city planning, and landscaping, design of recreational areas, should take into account the risks of pest infestation and disease transmission; 2) Construction regulations should ensure that new buildings are proofed against pests and do not create conditions conducive to the establishment of pest infestations; 3) 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; 4) It should be a requirement that proper risk assessments should be carried out before pesticides are applied; 5) A single Government Department should have ultimate responsibility for supervising monitoring programs and the implementation of pest management measures; 6) Liabilities of contractors, building managers, home owners, occupants and local authorities with regard to pest management should be made clear through adequate regulations.

International organizations and European Union Member States should agree on expanded and standardized notification requirements for pest-borne diseases at the international level, as well as other adequate mechanisms to collect and analyze data centrally and to make biological and epidemiological data publicly available. Early information is a clear requirement for developing adequate public health policies. The costs associated with obtaining pesticide approvals should be reconsidered. Member States should ensure that surveillance structures and suitably-educated staff are available. At national, as well as at local level, the authorities in charge of vector-related information should be identified clearly. The role of the respective partners, as well as coordination mechanisms, should be put in place. Member states and public health programs should encourage, support and promote pest-related scientific research. Public information should be developed in order to raise awareness by consumers on how to protect themselves by simple sanitary and behavioral measures and inform them on how to best store and use pesticides.

Member States, through the coordination of their public health authorities, should develop capacities for being able to identify pest-related risks in the urban environment (i.e. identify pests and pest-borne diseases presently occurring or having the potential to occur); determine and record the prevalence of infection; keep track of existing reservoirs of host species and the geographical distribution of various pests and their transmission dynamics. They should also keep an updated list of high risk areas. Of particular concern is the fact that there are now too few medical entomologists being trained at universities. Without this training, the underpinning expertise that has been built up over the years will be lost as the experienced and knowledgeable scientists retire. Correcting this shortfall and developing adequate monitoring systems will require a political will and the necessary resources to protect public health. Finding ourselves with a pandemic outbreak of disease and not having the resources to deal with it on the ground is a nightmare scenario but one that we may yet live to see.

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