

THE ROLE OF ENVIRONMENTAL HEALTH DEPARTMENTS IN ENSURING PEST FREE HOSPITALS

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Abstract—Pest Management is an important environmental health function and the eradication of chronic pest infestations must be considered a priority in contributing to effective public health. This is especially true in a hospital environment where, in addition to aesthetic objections, the presence of infestations may seriously compromise the health of patients. Pest animals, including rodents, birds and insects are attracted to buildings for shelter, food and harbourage and all of these elements may be present in abundance within a hospital complex. Since the removal of Crown Immunity, Local Authority Environmental Health Departments have had the opportunity to make an important contribution to protecting public health within hospitals by enforcing legislation which facilitates the control of pest species. In addition, some Environmental Health Departments are now involved in servicing pest control contracts at hospitals within their authorities. Environmental Health Departments were surveyed regarding the extent of their involvement with pest control at hospitals. Respondents were asked to indicate any pest species currently found at the hospital sites and the factors which may aid the continued persistence of these pests at the sites. The techniques and materials used in the construction of many older and most modern hospitals may predispose the buildings to infestations that are difficult to treat and almost impossible to eradicate. Respondents have also been asked to indicate the factors (including structural features) which hinder the eradication of chronic pest infestations. Recommendations regarding the management and appropriate treatment methodologies for pest control services at hospital sites are drawn from the survey data collected.

INTRODUCTION

Risks associated with pests

Pests in association with man are unwelcome and in a hospital situation where patients may have lowered auto-immunity, they pose an unacceptable and unnecessary public health risk. In addition to the anxiety and distress caused to staff and patients (Short, 1988), their potential to spread disease has been acknowledged (e.g. Cloarec *et al.* 1992; Fotedar *et al.*, 1991; Beatson, 1972). However, their exact involvement in the transmission of hospital-acquired infection remains uncertain (Sabria-Leal *et al.*, 1994; Geffen, 1987). In addition to the possibility of disease transmission, allergic reactions may occur (Kang, 1990), food may be tainted and spoiled, fabrics and building structure damaged and sterile packs and dressings contaminated (Aylyffe, 1992; Mason 1985; Wilkinson, 1988; Watkins and Wyatt, 1989).

Hospitals are generally complex buildings with fairly constant temperatures where a wide range of disparate activities are undertaken (Collins, 1988). An unwelcome consequence of many of these activities may be the creation of ideal environments for the support of many pest species, providing them with ample harbourage, shelter and/or food. Pest dispersion and survival are often aided by the activities and features common to most hospital sites. Firstly, the movement of materials (e.g. laundry, meals etc.) around and between hospital sites, facilitates dispersion over a wide area. Secondly, the equipment used within the hospital can often supply harbourages which result in infestations which are extremely difficult to treat. Electric motors in, for example, refrigerators provide the warmth which cockroaches need; the cabinets often become infested and the hollow supports of benching and trolleys provide ideal shelter and little access for cleaning or treatment. Thirdly, the constructional features within the buildings may facilitate the proliferation and maintenance of pest infestations (Griffin, 1988). Most hospital buildings are threaded with ducting which carries water, gas, electricity and drainage and provides a means of access enabling pests to reach and colonise many suitable areas within the hospital (Burgess, 1984).

Although it may be difficult to keep hospitals completely free of pests, every effort should be made to achieve a reasonable level of control or eradication, whichever is practicable. Clearly this will depend upon the type of pest present, the extent of infestation, the complexity of the buildings,

other local factors and the terms of the pest control contract (Ayliffe, 1992). NHS policy requires that unless there are 'compelling reasons', the lowest tender price should be accepted (pers. comm. Clive Lanabeer, NHS Executive, 1996) and this has raised concerns regarding the tender specifications and the appropriateness of tender bids. Superficial surveys of infestation status will uncover little evidence of pests and a low tender price will be submitted, resulting in palliative measures to suppress an infestation and keep pests 'out of sight'. Such measures will be ineffective in achieving complete eradication of the pest species (Robinson, 1988). The British Pest Control Association estimated that less than one fifth of one per cent of hospital budgets were spent on pest control and the priority afforded to pest control was often less than that afforded to window cleaning (Robinson, 1988). Whilst dirty windows may be more visible than pest infestations, it is obvious which poses the greater threat to public health.

Previous research on pest infestation rates in hospitals

Whilst a comprehensive survey of the prevalence and incidence of pest species in British hospitals has not been undertaken, several investigators have provided indicators of the infestation levels. Edwards and Baker (1981) sent questionnaires to 1207 hospitals and found *Monomorium pharaonis* reported in 11.6% of the hospitals surveyed. Baker (1981) analysed the requests for advice received by the Department of Health and Social Security (DHSS) from 93 hospitals over a 10-month period (see Table 1). Whilst these figures gave an indication of infestation rates, they clearly did not represent confirmed incidence.

Campbell (1985) surveyed 360 National Health Service (NHS) nurses and questioned them about sightings of pest species within the hospitals where they worked. 88.4% reported seeing pests such as cockroaches in their hospitals and 53.3% reported sightings of vermin such as rats and mice.

Baker (pers comm) reviewed infestation data from 172 NHS hospitals which had sponsored delegates on pest control training courses run by the DHSS during 1993. Analysis revealed that 56% of these units were infested with *Blatta orientalis*, 4% with *Blatella germanica*, 1% with *Supella longipalpa* and 3% with *Monomorium pharaonis*. Whilst this indicated an apparent drop in infestation rates, compared with earlier studies, significant infestations were still present.

Historical involvement of environmental health departments

Up until 1986, all NHS hospitals enjoyed immunity from prosecution in relation to contraventions of food hygiene law. In the early 1980's concerns were raised about standards of hygiene in hospital kitchens and the Institution of Environmental Health Officers, in conjunction with other powerful groups lobbied for crown immunity to be lifted from hospital sites. Although the Department of Health had issued guidance in 1981 regarding the control of pest species in hospitals (DHSS, 1981; 1984), no legal requirements were in place to address the possible threats to public health. The tragic consequences of a food poisoning outbreak at Stanley Royd Hospital in 1985, where 19 people died from food poisoning and a further 409 patients and staff became ill (DHSS, 1986),

Table 1. Number of requests for advice received by the DHSS from 93 hospitals over a 10 month period (from Baker, 1981)

Species	No. of hospitals requesting advice	Species	No. of hospitals requesting advice
Oriental cockroach	57	Firebrats and silverfish	4
Pharaoh's ants	36	Flies	3
Mice	22	Bedbugs	3
Cats	10	Crickets	3
Birds	7	Dermestid beetles	2
German cockroaches	7	Mites	2
Garden ants	7	Biscuit beetle	1
Rats	4	Spider beetle	1

ensured the final demise of Crown Immunity. The NHS (Amendment) Act 1986 lifted crown immunity from health service premises and made NHS food preparation areas subject to the provisions of the food legislation of the time, namely the Food Act 1984 and the Food Hygiene (General) Regulations 1970 and any subsequent food legislation. In Britain, Local Authority environmental health departments have the responsibility for enforcement of food hygiene law and following the lifting of Crown Immunity, three successful prosecutions were brought against English hospitals and several opted for voluntary closures of their kitchens as a result of pest infestations (Willcox, 1989). However, several years after the removal of crown immunity concerns continued to be raised about the number of hospitals in the UK suffering pest infestations above an acceptable level and the quality of work being undertaken by some of the contractors employed to service the pest control contracts.

Current NHS guidelines on pest control in hospitals

The current guidelines on pest control management in the Health Service were issued by the NHS Management Executive [HSG(92)35] in 1992. These guidelines and the accompanying booklet 'Pest control management for the health service' set out a recommended approach for pest control which would help to ensure that hospitals met their legal obligations in respect of the prevention of pest infestation in food preparation areas. General Managers and Chief Executives were advised to appoint individual officers who would have the day to day responsibility for all pest control measures throughout their units. These duties included the co-ordination of all local pest control activities, such as liaison with the contractor, monitoring of the contract service and advice on preventive pest control and contract specifications. They were also expected 'to liaise with the Pest Control Contractor, Chief Environmental Health Officer of the relevant local authority and appropriate personnel within the unit on matters relating to pest control'.

Hospital construction

The functional and technical success of the fabric of hospital buildings depends upon the ease with which they can be adapted and extended. Many existing hospitals have been built in several stages, with newer parts abutting onto older structures. Older parts may be adapted over time to accommodate new functions and an unfortunate consequence of functional changes within the structure may be the introduction of features (such as voids and suspending ceilings) which may facilitate the proliferation of infestations and hamper effective treatment strategies. Both those commissioning changes and those undertaking such work must consider carefully the possible consequences of the adaptations and where appropriate, consult those with infestation expertise.

METHODOLOGY AND RESULTS

There are approximately 2000 hospitals in Britain. Around 1750 are NHS Trust hospitals and 250 are private hospitals. NHS trusts are self-governing, public corporations within the NHS and have greater freedom in managing their own affairs. This research was undertaken to investigate the involvement of local authority environmental health departments in the control of pests at hospital sites.

Questionnaires were sent to all local authority chief environmental health officers in England, Wales, Scotland and N. Ireland (n=486). Three hundred and twenty one questionnaires were returned, giving a response rate of 66%. Seventeen of the respondents (5.3%) did not have a hospital facility within their boundaries and were excluded from further analysis. The average number of hospitals within each local authority was 3.7. Respondents were asked whether pest control contracts at the hospitals were undertaken by the pest control section of the local authority. Twenty-one respondents (6.9%) did undertake this service. Those who did not undertake pest control were asked why they were not involved in servicing hospital pest control contracts. Table 2 presents these responses.

Table 2. Reasons given as to why local authority environmental health departments were not involved in servicing hospital pest control contracts

Reasons why EH Departments were not involved in Pest Control at hospital sites	Number of authorities*
Never been invited to tender	193
Conflict with enforcement	75
Lack of staff	72
Lack of time	52
Lack of money	19
Lack of technical expertise	6
Other†	74

*Respondents were asked to tick all which applied.

†Analysis of this category revealed five main groupings: Local authority pest control services contracted out (20); Unsuccessful tender (17); Only domestic treatments undertaken by the Local Authority (14); Local authority did not offer pest control services (10); Problems with tender specifications (8).

Use of statutory instruments in relation to pest control

Respondents were asked whether they had taken formal or informal action against hospitals in relation to pest infestations in the past five years. Sixty-seven stated they had taken informal action and eight stated they had taken formal action. As expected, the vast majority used the powers relating to food safety (see Table 3).

Providers of pest control services at hospital sites

Respondents who did not undertake pest control at the hospital sites in their area were asked to indicate who provided the service. Almost half (47.8%) stated that private pest control companies undertook this task. Over 40% were unable to confirm who undertook pest control at the hospitals in their area (see Table 4).

Current infestation levels at hospital sites

Respondents were asked to indicate whether they were aware of any current infestations. Many of the respondents were unable to give details of current infestations, but the responses of those who

Table 3. Statutory instruments used in relation to formal/informal actions relating to hospital pest infestations

Legislation	Formal	Informal
Public Health Acts (1936 & 1961)	1	1
Environmental Protection Act 1990	3	4
Prevention of Damage by Pests Act 1949	3	13
Food Safety Act 1990	7	51
Other	2	3

Table 4. Current providers of pest control services at hospital sites

Hospital Pest Control Contractor	Number
Private pest control company	143
Local Authority Environmental Health Department	21
Hospital in house	7
Don't know	128
Total	299

Table 5. Ranking of 'current' infestations compared with those from Baker (1981)

Species	Ranking	
	Current study	Baker (1981)
Oriental cockroach	1	1
Black ant	=2	=5
Pigeon	=2	=5
Mice	4	3
Feral cats	5	4
Rats	6	8
Crickets	=7	10
Fleas	=7	-
German cockroaches	=7	=5
Pharaoh's ants	=7	2
Dermestid beetle	11	13

replied were ranked and this ranking compared with the rankings reported by Baker (1981) (see Table 5).

Clearly neither this study nor Baker's (1981) reported *confirmed* infestations, but comparison of the rankings gives an indication of the changing patterns of infestations. One of the most striking differences was the change in ranking for Pharaoh's ants - from 2 in 1981 to 7 in 1995 - which may reflect the advances made in pest control technology. The advent of IGRs probably accounts for the successful control of this insect. Also of interest was the continued primary ranking of *Blatta orientalis*. A review of the pest control strategies adopted at 8 of a total of 15 major NHS hospitals in Manchester by the city's Planning and Environmental Health Department between 1990 and 1995, (Oldbury and Murphy, unpublished) demonstrated that these insects could be controlled by adopting an integrated approach. Early surveys revealed significant cockroach activity (principally *Blatta orientalis*) when treatments were initiated in the early 1980s but these infestations have now been virtually eradicated from those hospital sites. Adult cockroaches are now rarely found on monitoring traps and emphasis has switched from the detection of adults to the detection of early instar nymphs.

Monitoring for pest control

Respondents were asked whether the existing pest control programme at the hospital site provided for on-going monitoring and to indicate how frequently sites were checked for pest activity. Whilst the majority of respondents were unable to give details about the monitoring activity, 120 did reply and 83 respondents (69%) stated that the current programme did incorporate monitoring and only 3 (2.5%) stated that no monitoring activities were undertaken (the remainder were unable to state whether monitoring was undertaken). Wildey (1988) stressed the importance of monitoring and anticipated that approximately 10% of the full riddance and maintenance contract cost should be spent on it. Successful eradication strategies (e.g. Oldbury and Murphy, unpublished) have highlighted the need for continued vigilance through regular monitoring.

Constructional features

Building design can often exacerbate the problems encountered in attempting to control pests within a hospital complex. Clearly different areas of the hospital will present different degrees of risk should pests be present. Respondents were asked to rank the areas they felt presented the greatest risk of infestation. The first, second and third rankings for each area were summed and are presented in Table 6. As expected the kitchens were the primary focus of concern. In addition, the ductings, boiler house and laundry were also identified as high risk areas. This finding highlights the importance of monitoring disparate areas within the hospitals which may provide the source of continued infestations.

Table 6. Areas most likely to support infestations within the hospital

Area	No. of Authorities Giving Ranking 1-3
Kitchen	48
Ducting	38
Boiler house	34
Laundry	31
Ward	19
Theatre	4

Table 7. Responses indicating the most likely features within hospitals which were felt to exacerbate the persistence of pests

Feature	Constructional Type		
	Existing	Refurbished	New Structure
Ducting	59	25	19
Voids	55	23	16
Poor Maintenance	40	15	13
Poor Hygiene	30	14	10
Suspended ceilings	28	19	15
Stud partitions	22	13	10
Other	12	4	6

Respondents were asked to identify the constructional features which they felt exacerbated the existence of pest species and were asked whether these features were likely to occur in existing, refurbished or new structures (see Table 7).

Ductings and voids in each of the categories were identified as the *most* likely features to perpetuate pest problems in all three types of construction (existing, refurbished and new structure) and existing structures were identified as the most likely source of infestation. However the problems of poor maintenance and poor hygiene were also highlighted. Oldbury and Murphy (unpublished) have underlined the importance of integrated pest management in the control of cockroaches. The Manchester study liaised closely with the authorised officers at the hospitals and rapid maintenance targets were established to contribute to the integrated programme.

DISCUSSION

Environmental health departments have an essential role to play in ensuring that hospitals are free from pests and that patients, staff and visitors are not exposed to unnecessary risk. Clearly, the removal of Crown Immunity in the late 1980s enabled Environmental Health Departments to contribute to the improvement of conditions within food preparation areas. The latest food hygiene legislation (The Food Safety (General Food Hygiene) Regulations 1995) requires enforcing agencies to assess the hazards associated with the commercial preparation of food and to plan an appropriate inspection schedule which reflects the food safety hazards associated with that operation and risks to the consumer. Premises which serve vulnerable groups are given additional hazard scores, which will increase the frequency with which they are visited. Hospitals are likely to fall within the highest risk category, necessitating inspections every six months. These regular visits should help to establish closer links between the hospital staff and the environmental health departments.

The results from the questionnaire, whilst highlighting encouraging trends in the relationships between hospital managers and environmental health departments also underscore the need for greater involvement. Whilst many environmental health departments may feel that the provision of treatment services may conflict with their enforcement role, there are opportunities to contribute to

effective pest control in other ways. Authorised officers within the hospitals may feel unqualified or untrained to commission and monitor the work of contractors. Environmental health departments may be able to provide valuable, impartial advice to the authorised officers. There may be opportunities to establish local forums which bring together the hospital staff, environmental health staff and contractors to allow productive discussions on the future strategies required to maintain pest free environments. These forums may also have a contribution to make when suggestions for refurbishment or adaptations to existing structures are proposed. They could advise architects and facilities managers on the features which may encourage the proliferation of pest species and thwart treatment regimes.

Those environmental health departments currently involved in both the servicing of pest control contracts and the enforcement of public health legislation do not appear to have encountered conflicts in their roles as both servicer and enforcer. It is hoped that further research may elucidate how they manage the potential conflicts which could arise when operating as enforcer and servicer and that guidelines could be produced to enable more environmental health departments to become involved in this area of pest control work - seventeen of the Environmental Health Departments who were not currently involved in the servicing of hospital pest control had tendered unsuccessfully in the past. The 'model contract' which was produced by the DHSS and the British Pest Control Association (BPCA) could provide an excellent starting point in producing guidelines for local authorities who wish to become involved in pest control servicing.

An integrated approach incorporating the careful negotiation of appropriate pest control contracts, the prudent use of pesticides (with the emphasis on novel compounds such as hydramethylnon and/or IGRs such as hydroprene), proactive site monitoring and the involvement of hospital staff, coupled with effective liaison between authorised officers, contractors and where appropriate environmental health departments, should ensure that the vast majority of hospitals achieve pest free environments and eliminate a potential public health risk.

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