

TAKING TOXICS OUT OF MARYLAND'S HEALTH CARE SECTOR

TRANSITIONING TO GREEN PEST MANAGEMENT PRACTICES
TO PROTECT HEALTH AND THE ENVIRONMENT

INTEGRATED PEST MANAGEMENT IN HEALTH CARE FACILITIES PROJECT



MPN
MARYLAND PESTICIDE
NETWORK



**BEYOND
PESTICIDES**

THE INTEGRATED PEST MANAGEMENT IN HEALTH CARE FACILITIES PROJECT

The Integrated Pest Management (IPM) in Health Care Facilities Project promotes the adoption of IPM through research, education, and outreach to Maryland's health care facilities, and works directly with select Maryland health care facilities through pilot partnerships on IPM strategies that allow them to reduce or eliminate patient and employee exposure to toxic pesticides through, non-chemical pest prevention, natural land care and last-resort use of least-toxic pesticides. The project also conducts a community outreach program in partnership with Morgan State University's Community Health and Policy Program to educate underserved Baltimore communities surrounding select pilot facilities about the hazards of pests and pesticides and assist them in adopting IPM practices to reduce their exposure to both.

PROJECT PARTNERS

The Maryland Pesticide Network

(MPN) is a grassroots coalition of 25 Maryland organizations dedicated to protecting the public and the environment from toxic pesticides and promoting healthy alternatives. Founded in 1994, MPN's diverse membership includes health care provider, consumer, environmental, parent, labor, agricultural and religious organizations. The impact of pesticide use is a complex issue about which we will never have perfect knowledge. Therefore, the coalition's work is based on the precautionary principle which states: "When an activity raises threats of harm to human health or their environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."

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Beyond Pesticides

Beyond Pesticides, founded in 1981 as the National Coalition Against the Misuse of Pesticides, is a national community-based organization of grassroots groups and individuals, which bridges environment, health, urban and rural concerns to: stimulate widespread education on the hazards of toxic pesticides, and the availability of effective alternative pest management approaches in the context of protecting the public's health; influence decision makers responsible for pest management to use safe methods through grassroots action; and, encourage the adoption of local, state and national policies that stringently restrict pesticide use and promote alternative approaches that respect health and the environment.

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IN COLLABORATION WITH Maryland Hospitals for a Healthy Environment

Maryland Hospitals for a Healthy Environment, housed at the University of Maryland School of Nursing, is a technical assistance and networking initiative that promotes environmental sustainability in health care. MD H2E professionals provide assistance in the areas of pollution prevention, environmentally preferable purchasing, waste reduction, mercury elimination, recycling, green building, integrated pest management, sustainable food practices and more. MD H2E helps health care facilities improve patient, staff, and community health and safety; keep up-to-date on Maryland-specific environmental regulatory issues; identify and implement cost-effective environmental programs; and receive public recognition for creating a healthier environment for patients, staff and the community.

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EXECUTIVE SUMMARY

Taking Toxics Out of Maryland's Health Care Sector reports on a shift in Maryland's health care sector away from the use of toxic pesticides in the management of health care facilities. Major health care institutions in the state are now embracing pest management strategies for their facilities that give priority to non-chemical pest control methods and only use defined least-toxic chemical strategies as a last resort.

While conventional pest management relies heavily on toxic chemicals, the Integrated Pest Management (IPM) in Health Care Facilities Project, spearheaded by the Maryland Pesticide Network and Beyond Pesticides in collaboration with Maryland Hospitals for a Healthy Environment (MD H2E), is working with major medical, psychiatric and elder care facilities in the state to protect health care facility patients, visitors, staff, and the environment from the hazards of pesticides. This transition is coming at a time when health care facilities across Maryland and nationwide are embracing "green" management strategies.

A statewide survey conducted by the Project (Maryland Health Care Facilities Pest Management Survey) reveals a general reliance on toxic pesticides at Maryland hospital and elder care facilities for pest control. Of the 25 pesticides identified by survey participants as being used at facilities, 11 are linked to cancer, 12 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause birth defects or developmental effects, 12 are sensitizers or irritants, 10 cause liver or kidney damage and 6 are suspected endocrine disruptors.

The results of the survey led to the Project's collaboration with 13 health care facilities that are committed to achieving effective pest control with safer, least-toxic pest management systems that protect the health of vulnerable patients and residents and reduce the pesticide burden on the environment. The initial seven facilities that joined the Project in 2006 have made substantial progress in achieving their green pest management goals and share a common goal of serving the health of their communities. They include:

- Broadmead Retirement Community
- Johns Hopkins Bayview Medical Center
- Johns Hopkins Hospital
- Riderwood Retirement Community
- Sheppard and Enoch Pratt Hospital
- Springfield Hospital Center
- University of Maryland Medical Center

An additional six facilities joined the project in 2008. (See Appendix 4 for full list.)

The pilot facilities have been assessing current practices, evaluating causes of pest problems, and adopting measures that seek to prevent pests through non-chemical means of sealing pests out and eliminating the food, harborage and entryways that are attractive to pests. The Project, through a series of walk-through assessments conducted by national experts, has provided the pilots with tools and recommendations to develop policies and plans for ongoing programs committed to the health of people using and working in the facilities and living in the surrounding community.

The primary focus of this report is structural pest management, those practices utilized to manage the facilities' buildings. Efforts are ongoing at the facilities to address management practices on the grounds of the facilities, where natural landcare practices on turf and landscapes are being developed.

The integrated pest management policies and programs promoted by the Project establish critical challenges that require new ways of educating and coordinating facility staff, defining acceptable chemicals and overseeing pest control companies in health care environments, and reaching out to patients and the community to advance pest management practices that "do no harm."

CONTENTS

Chapter I: Introduction	1
A. Overview	1
B. Methodology	2
Chapter II: Maryland Health Care Facilities Pest Management Survey	4
A. Survey Executive Summary	4
B. Findings.....	4
Chapter III: Health Care Facilities Pilot Program	10
A. Environmental Leaders in the Field	10
B. Evaluation Criteria	11
Chapter IV: Conclusion	16
Health Facility Perspective	16
Managing a Hospital that Protects Health and the Environment	17
Appendix 1: Maryland Hospital Survey Pesticide Usage and Toxicity Summary	16
Appendix 2: Answers to Survey Questions	22
Appendix 3: Least Toxic Pesticides	29
Appendix 4: Pilot Facilities in the Integrated Pest Management (IPM) in Health Care Facilities Project	31
Appendix 5: Guide to Contracted Integrated Pest Management Service Provider Oversight	32

CHAPTER I: INTRODUCTION

A. OVERVIEW

The health care sector is becoming a leader in an age of environmental or “green” practices. In addressing the hazards of toxic chemical production, use, and exposure, health care facilities are increasingly identifying toxic pesticides as a central health and environmental concern. Toxic chemical-based pest management in health care facilities unnecessarily exposes patients (who are particularly vulnerable), visitors, and health care workers to pesticides and a range of associated adverse health effects, from cancer, to reproductive, nervous system, immune function, and respiratory illness. In fact, the U.S. Department of Veterans Affairs has said (Pest Management Operations, 1986), “Pest management in health care facilities differs from control practices in other types of institutions. The effect on patients in various stages of debilitation and convalescence, and in varied physical and attitudinal environments, requires that a cautious, conservative policy be adopted concerning all uses of pesticides.”

Through the Integrated Pest Management (IPM) in Health Care Facilities Project, spearheaded by the Maryland Pesticide Network and Beyond Pesticides in collaboration with Maryland Hospitals for a Healthy Environment (MD H2E), more than a dozen environmental leaders in the health care facility sector in Maryland have taken up the challenge of toxics reduction and elimination in their buildings and grounds through institutionalization of pest management programs that focus on non-chemical pest prevention strategies to avert pest problems. The integrated pest management (IPM) approach utilized in the Project prevents pests without chemicals as a first line of defense and considers defined least-toxic chemical pesticides as a last resort. Through their efforts, Maryland facilities are national leaders on IPM in the health care sector.

Similar to other sectors, pest management in health care settings often escapes the scrutiny of institutional “greening” efforts. Reasons for this extend from a fundamental misunderstanding of the health risks of chemical pesticides (especially for vulnerable and sensitive populations in health care facilities), false belief that toxic pesticides are necessary in pest control, to the outsourcing of pest control to service providers that utilize chemical-intensive approaches. These factors typically lead to a widespread and systematic reliance on chemical pesticides to prevent and control pests in the health care sector and generally in pest control.

Defining IPM

Programs often described as IPM lack clear definitions of program components or adequately protective standards, a situation exacerbated by the tendency of health care facilities to defer to the perspective of contracted pest control companies without adequate facility involvement, oversight, or assessment of the vendor’s practices and products used. Time and again, the IPM in Health Care Facilities Project has found that delegating pest control decisions to the pest management industry, without governing policies or other requirements that give priority to non-chemical methods and mandate reduction or elimination of toxic chemical use, can institutionalize unnecessarily hazardous approaches to pest control.



Reliance on Toxic Pesticides by Health Care Facilities Statewide

A 2005-2006 survey, *Maryland Health Care Facilities Pest Management Survey*, conducted by the Project reveals an overall reliance on toxic pesticides by Maryland hospital and elder care facilities for their pest management programs. Of the 25 pesticides identified as being used at facilities, 11 are linked to cancer, 12 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause

“The effect on patients in various stages of debilitation and convalescence, and in varied physical and attitudinal environments, requires that a cautious, conservative policy be adopted concerning all uses of pesticides.”

birth defects or developmental effects, 12 are sensitizers or irritants, 10 cause liver or kidney damage and 6 are suspected endocrine disruptors. Of the 13 pesticides identified as being used for lawn and landscape care, two potentially leach and contaminate groundwater, 8 are toxic to birds, 8 are toxic to fish, 10 are toxic to aquatic organisms, and 3 are toxic to bees.

Despite an overall dependence on chemical approaches and a lack of stated commitment or policy to only use pesticides as a last resort, it is encouraging that a significant number of facilities (45%) recognize that their IPM program should address the root causes of the pest problem, such as sanitation, mechanical sealing, or structural repairs.

Pilot Sites Adopting New Approaches

To tap into concern about toxic chemical use, the Project has partnered with 13 Maryland health care facility pilot sites to evaluate their state of pest management practices and approaches to safer alternatives. These facilities chose to participate as pilots to forward their vision of patient, worker and community safety and in the context of other “green” initiatives at their facilities.

The evaluations, conducted through a series of individual surveys, “walk-through” assessments, and consultations with independent pest control advisors, led to new thinking and management strategies to improve systems and increase health protection, including better record-keeping, staff training, interdepartmental communication, policies and contracts, and oversight of pest control vendors. Project staff opened direct lines of communication with pest control companies that have become increasingly responsive to proposed changes in IPM protocols, selection of defined least-toxic chemicals to be used as a last resort, and communication of pest-conducive conditions and other issues to their facility client. Facility staff became committed to putting the necessary apparatus in place to ensure that underlying problems contributing to pest issues are documented by the pest control company and addressed by the facility in a timely fashion.

B. METHODOLOGY

The IPM in Health Care Facilities Project was launched in 2005 to bring the health and environmental benefits of integrated pest management to health care facilities in Maryland. The project grew out of the report *Healthy Hospitals: Controlling Pests Without Harmful Pesticides*, based on a study of pest management at hospitals across the U.S. conducted by Beyond Pesticides and Health Care Without Harm (2003). The report documented significant reliance in the health care sector on pest management that emphasizes chemical intervention with toxic effects. With the backdrop of this report, the Project initiated a:

- Mail survey of the state of pest management practices in Maryland health care facilities (including hospitals, psychiatric facilities, and elder care facilities) to identify the full range of approaches and chemicals used.

- Pilot IPM program to work closely with facilities interested in adopting model pest management policies and programs to curtail toxic chemical use and serve as a model for Maryland's health care sector.

Survey Methodology

The survey represents a snapshot of pest management practices of hospitals and elder care facilities in the state of Maryland. Surveys were mailed to 56 hospitals and 140 elder care facilities. Respondents include 44 of the surveyed sites, or 22%, with a response rate of 59% for hospitals, including 32 medical hospitals and two psychiatric hospitals (3 of the hospitals have a nursing home, rehabilitation and long-term recovery or assisted living facility), and 8% for elder care facilities.

The survey asked questions regarding indoor and outdoor pest management practices, delineating pest management conducted in-house and services provided by a contractor. The survey also ascertained whether and what type of IPM approaches are being implemented, the nature and degree of pest issues, whether and what types of pesticides are used, and the types of training, notification, and record-keeping at the facility, if any.

Pilot Site Methodology

To date, 13 Maryland health care facilities (hospitals, psychiatric facilities, and elder care facilities) have volunteered to collaborate with the IPM Project on pilot partnerships. Work at each pilot site includes a detailed pesticide use survey and walk-through evaluation conducted by expert IPM practitioners. The on-site evaluation included reviews of logbooks and technician reports and interviews with facility and pest control company staff. In most cases, the walk-throughs were accompanied by the pest control vendor for the facility. The walk-through evaluation provided pilot facilities with an in-depth analysis and recommendations for moving forward with changes in health care facility policy, contracts with pest control vendors and associated practices, and facility-wide changes in pest management, contractor oversight, and staff training and education.



CHAPTER II: MARYLAND HEALTH CARE FACILITIES PEST MANAGEMENT SURVEY

A. SURVEY EXECUTIVE SUMMARY

The *Maryland Health Care Facilities Pest Management Survey* reveals an overall reliance on toxic pesticides by Maryland hospital and elder care facilities for their pest management programs. The survey indicates that nearly all facilities contract for structural pest control (93%) and lawn care (70%). At these facilities, the survey found limited oversight of specific methods and chemicals used by contractors, inadequate disclosure of pesticide use to staff, patients and visitors, and few facilities that provide training for health care facility staff on pest management. While most characterize pest control at their facility as integrated pest management that relies on non-chemical preventive techniques, mechanical methods and biological controls, the majority of the sites responding to the survey indicate that they do not give priority to non-chemical methods.

80% of Maryland's hospital and elder care facilities, ranging in size from 62 to 365 beds, use toxic pesticides in their buildings.

Of the 25 specific pesticides identified by survey respondents as being used at facilities, 11 are linked to cancer, 12 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause birth defects or developmental effects, 12 are sensitizers or irritants, 10 cause liver or kidney damage and 6 are suspected endocrine disruptors. Of the 13 pesticides identified

as being used for lawn and landscape care, two potentially leach and contaminate groundwater, 8 are toxic to birds, 8 are toxic to fish, 10 are toxic to aquatic organisms, and 3 are toxic to bees.

Despite an overall dependence on chemical approaches and a lack of stated commitment or policy to only use pesticides as a last resort, a significant number of survey respondents (45%) recognize that their IPM program should address the root causes of the pest problem, such as sanitation, mechanical sealing, or structural repairs, which is the basis for an IPM program that minimizes toxic exposure. This is the basis for putting in place pest management systems for hospital and elder care facilities that are designed to protect the at-risk population, those who because of illness or age are among the most sensitive to chemicals known to cause or exacerbate nervous and immune system damage, cancer, respiratory problems, adverse impacts on reproductive and endocrine systems, and other health effects.

B. FINDINGS

The findings of the survey indicate that 80% of Maryland's hospital and elder care facilities, ranging in size from 62 to 365 beds, use toxic pesticides in their buildings, while 11% said they did not, and 9% did not know or answer the question. At the same time, 34% of the facilities use toxic pesticides in their landscaping programs, while 45% said they did not and 21% did not know or answer the question.

a. Contracted and In-House Pest Management

The vast majority (93%) of Maryland health care facilities contract for structural pest management services and 70% contract for landscaping services. Respondents indicate that they run in-house programs for structural and landscape management 5% and 16% of the time, respectively. In most cases (21) the contractor's performance is monitored by the facility manager or the environmental services director (9), less frequently by the maintenance or housekeeping director, or grounds supervisor.

i. Integrated Pest Management

Most facilities believe that they have an integrated pest management (IPM) program in place. When asked if the contract service company provided a facility IPM plan for indoors, 89% indicate yes, 2% say no, and 9% did not answer or did not know. The survey did not elicit a specific definition of IPM in most cases, however specific answers to questions identified many of the elements of IPM, at the same time that they indicated that the majority of programs in place are chemical-dependent. In fact, 80% of respondents indicate that their pest management program utilizes chemicals. Only 9% add any qualifying statements, such as only when needed beyond thresholds or only approved products are used. 45% of sites describe IPM techniques as addressing the root cause of the problem, such as sanitation, mechanical sealing, or structural repairs, however they do not give priority to non-chemical methods. Rather, they describe IPM as incorporating a combination of approaches, including chemical products.

With a high percentage of structural pest control reliant on pesticides (80%) and fewer for outdoor management (34%), there is some awareness that other techniques should be used before bringing chemicals into the facility. It is significant that 11% of facilities indicate that no chemical pesticide products are used in structural management and 45% indicate no use of chemical products on the facilities' lawns and landscapes. One respondent captured the essence of a prioritized IPM system, when in answer to the question of including the use of chemical pesticide products, it was said, "No, only extreme measures (chemicals) are used when all else fails."

iii. Contractor-related Right-to-Know

Despite a Maryland law requiring commercial applicators to post pesticide-treated landscapes with a warning sign, respondents indicate that notification of pesticide use is more common for structural pesticide use than for lawn and landscape use. Sixty-four percent of the indoor contractors and 36% of the outdoor contractors alert the facility personnel to the potential acute and long-term health effects of the pesticides it uses in the indoor and outdoor environment. Eighteen percent of indoor contractors and 14% of outdoor contractors did not alert the staff to any health effects, with 18% of indoor contractors and 50% of outdoor contractors not answering or indicating that they did not know.

Of the respondents that answered yes to using chemicals inside the facility, only two say they did not have Material Safety Data Sheets (MSDSs) on file for the indoor environment. In all, thirty-nine (89%) have MSDSs, and one indicates the question is not applicable because they do not use pesticides indoors.

Of those that use pesticides outdoors, 87% have MSDSs and 13% did not answer.

Overall, those that have MSDSs keep them in the facilities' environmental, maintenance, safety, or housekeeping office, in some type of log book.

Most of the facilities (80%) that make MSDSs available to the public do this on a walk-in basis, by phone or written request, or some combination.

iv. In-House Pest Management

The sites that maintain in-house pest management, which are a small percentage of the survey respondents (5% for indoor and 16% for outdoor), provided less information on their practices. Between the two facilities that do not contract for structural pest control, one describes an IPM approach and pest management plan that only uses "approved products." Since there is no official approved list of IPM products, it is assumed that this reference is to the list of EPA-registered pesticide products, which span the range of toxicity and hazards. The other facility left the question blank. Regarding outdoor man-

agement, 29% indicate that they do not use pesticides. Only one site indicated that they are aware of information about the potential acute and long-term health effects of the pesticides they use and keep Material Safety Data Sheets (MSDS's) on-site, and make them available to the staff.

b. Pest Management Practices

i. General IPM Methods

Twenty facilities (45%) describe IPM techniques that address the root cause of the problem, such as sanitation, mechanical sealing, or structural repairs, however most were in combination with baits, traps, chemical sprays and crack and crevice treatments. In some cases, not enough specifics were given (e.g. sanitation first, then chemical) to determine the full IPM approach.

A significant number of survey respondents (45%) recognize that their IPM program should address root causes of pest problems, such as sanitation, mechanical sealing, or structural repairs.

It is important to note that the one hospital that described a totally preventive approach reported no pest problems during the survey period.

The kinds of pest management techniques used by the majority of facilities include: exclusion techniques that include seal openings (cracks and crevices), door sweeps and structural repairs that include repair of leaking pipes; mechanical tech-

niques that include the use of traps and vacuuming; and sanitation techniques that include trash management. Mentioned as an exclusion technique only once is caulking and harborage reduction (such as elimination of storage in cardboard boxes). In the sanitation area, 50% of the facilities indicated two important practices, washing recycling bins and floor drain covers; power washing kitchens and cleaning floor drains were cited 34% and 11%, respectively.

ii. Pest Problems

Ants, cockroaches and rodents (mice and rats) are the predominant pest problems identified in Maryland health care facilities. Other indoor pests identified include flying insects (generally), bees, gnats, fruit flies, spiders and termites. Outdoor pests identified include birds and pigeons, clover mites, grubs. Seven percent of facilities indicate no pest problems.

iii. Specific Techniques Used

Specific methods for cockroach control identified by respondents include vacuuming, glue boards, insect growth regulators, and crack and crevice treatments. For rodent control, respondents identified removal of ivy and ground cover that provided harborage, cleaning nesting areas, dusting burrows with tracking powder, structural improvements in patient rooms at all units, repairs, snap traps and mechanical traps in areas of activity.

Thirty-percent of facilities describe techniques that are not considered IPM. In these cases, the majority of the emphasis was on baits and traps first, with no identification or correction of the conditions that are attracting the pest problem.

Three answered not applicable because they do not have pest problems, and six did not answer the question even though 3 of those described pest problems.

c. Overall Chemical Use Characterization

Thirty-two percent of facilities indicate that pesticide sprays, baits and gels are used as a first resort when a pest problem is identified.

i. When Pesticides Are Used As A First Resort

The facilities indicate numerous examples of when they respond to the identification of a pest with a pesticide treatment, without describing any attempt to address the underlying causes, or possible causes, of the pest problem. What follows is a list:

- Area of roach activity is treated with a gel type ... cracks and crevices.
- Insect sightings in food and beverage areas
- Isolated rat burrows outside were dusted and “heaved”.
- Tracking powder in rat burrows exterior
- Mice problems, ants, crickets, and occasionally rodent problems outdoors.
- Patient area ants bait installed.
- Monthly spraying by contractor for mice and flies were listed pests.
- Pesticides are applied before millipedes and centipedes become an issue.
- Preventive application of low toxicity gel baits in kitchens.
- Roach gel used to treat around the steamer to help to quickly get rid of the pests.
- Roaches gel baits/ants-gel baits.
- Rodents during initial month of service.
- Spray for ants in the spring outside the building.
- Baiting treatment upon visual inspection that finds a problem.

ii. Pesticides Used and Areas of Application

Eighty percent of the respondents submitted a list of pesticides used at their facilities and, for the most, identified the area(s) in which they were being used. The survey identifies a total of 25 pesticides being used inside and outside of these facilities. These chemicals, associated with a range of short- and long-term health effects, represent an exposure pattern to a population that is considered high-risk because of existing medical conditions that make them especially vulnerable to toxic chemical exposure.

Indoor pesticide use. Of the 19 pesticides identified as being used inside facilities, 11 are linked to cancer, 10 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause birth defects or developmental effects, 12 are sensitizers or irritant, 8 cause liver or kidney damage, and 4 are suspected endocrine disruptors. (See appendix 1 for list of specific chemicals, use sites, and potential adverse effects.)

Pest problems are identified in interior spaces such as kitchens, cafeterias, offices, patient rooms, cluster units, restrooms, common areas, and storage, break, laundry and trash rooms. Some respondents specified generalized use to the interior without specifying specific areas or rooms.

The majority, 59% of health care facilities, identify pest problems in kitchens, cafeterias or food service areas. Pests in food service areas are most often ants, cockroaches, mice, flying insects and termites.

The majority of respondents stated that they use the specified pesticides on an as-needed basis. In some cases there was a one-time application as needed, but many respondents answered as-needed in conjunction with weekly, monthly, quarterly, annually. Many are immediately reaching for pesticides when they see a pest problem. This practice and these use patterns suggest that the root causes of the pest problems are not being addressed, and therefore, true IPM practice is not being followed.

Thirty-two percent are spraying (not in crack and crevice) pesticide formulations, or broadcasting pesticides in areas of their health care facility. Of most concern are the applications of spray formulations applied on a weekly, monthly, quarterly or annual basis to interior spaces such as kitchens, cafeterias, offices, patient rooms, cluster units, restrooms, common areas, and storage, break, laundry and trash rooms. *In many cases three to four different pesticides are used in the kitchens and up to six different pesticide products are used in cafeterias.*

Outdoor pesticide use. Of the 13 pesticides identified as being used for lawn and landscape care, two potentially leach and contaminate groundwater, 8 are toxic to birds, 8 are toxic to fish, 10 are toxic to aquatic organisms, and 3 toxic to bees. (See appendix 1 for list of specific chemicals, use sites, and potential adverse effects.) The facilities utilizing these pesticides do not indicate that they are implementing an IPM program.

d. Notification, Staff Training, and Record-keeping

i. Staff Information and training

Sixty-four percent of facilities provide no education or training for employees about pesticides and their potential adverse health effects. This raises serious questions about whether staff has adequate knowledge of the hazards of pesticides. If an IPM program that does not rely on pesticides is to be successful, effective staff involvement in the program can be motivated by the knowledge that their efforts help to avoid exposure to chemicals that can cause harm.

ii. Staff Notification

Fifty-nine percent of facilities indicate that they have an ongoing notification program in place to provide staff members with notification of pesticide use. However, the facilities use a range of activities, most commonly the posting of warning signs. Other notification methods include flyers in staff boxes, e-mail notification, management notification, and verbal notification.

iii. Patient Notification

Twenty-five percent of facilities provide for some type of patient notification of pesticide use. Those that do notify use posting and handouts, verbal notification, and MSDS's, if requested.

iv. Outdoor Notification

Maryland law requires the posing of lawns and landscapes treated with pesticides by commercial applicators. Twenty-three percent of facilities report posting lawn areas, less than the 34% of facilities that report using lawn and landscape pesticides. These sites appear to be in violation of Maryland state law, which requires commercial applicators to post warning signs on pesticide-treated lawns and landscapes.

v. Other Forms of Notification

Of the four facilities that provide other forms of notification, one described a notification of residents and staff prior to the application of pesticides.

vi. Record-keeping

Eighty-two percent of the respondents keep records of the pesticides used indoors at their facility. Records are kept by a variety of personnel in the following departments: maintenance, environmental services, housekeeping, business, plant operations, safety, facility management, or some type of log book in an unspecified location. For the nine that keep indoor records with the contractor, they also keep records at the facility.

For outdoor pesticide use record-keeping, 39% keep records. A similar array of personnel keep the records as described above.

Records are generally kept between two and seven years.

vii. Pesticide Management Annual Costs

The cost of structural pest management reported by facility respondents range from \$1,756 in the smallest facility surveyed (60-75 beds) to \$15,000 in the largest facility (350 to 375 beds). The cost for lawn care services ranged from \$1,100 to \$12,500.

NUMBER OF BEDS	INDOOR IPM COSTS (CONTRACTED)	INDOOR IPM COSTS (IN HOUSE)
60 -75	\$1756 - \$3000	No information
76 -139	No information	No information
140-160	\$1900-\$7500	\$4150
175	\$3500	No information
275-300	No information	No information
350- 375	\$4798-\$15,000	No information

IV. Follow-up

While the survey provides an important snapshot of the pest management practices of Maryland hospital and elder care facilities, the responses also indicate the need for more research and follow-up to clarify the picture of what is going on regarding practices. Because of split management responsibility of health care facility buildings and grounds, the survey responses are often incomplete for the outdoor portion, with a higher percentage of unknown or incomplete answers. Further research should verify if less is known about outdoor management by facility managers.

However, the data collected in this survey provides important insight into trends and activities and identifies important needs for developing better defined pest management plans and practices for Maryland’s health care facilities. Without a concerted effort in this area, patients of Maryland’s hospitals and residents of elder care facilities will be unnecessarily exposed to toxic chemicals that represent a threat to their well-being.



CHAPTER III: HEALTH CARE FACILITIES PILOT PROGRAM

Since 2006, the seven pilot health care facilities in Maryland have been transitioning their pest management programs to “green” Integrated Pest Management (IPM) that seeks to avoid hazardous pesticide-dependent practices and institute pest prevention techniques resulting in better pest control. The IPM pilot partners are working to achieve this type of IPM through:

- Staff education on the health and environmental risks of pesticides.
- Third-party assessment of pesticide use and pest management approaches and conditions at the facility.
- IPM plans for meeting the challenges of defined least-toxic IPM.
- IPM contracts with pest management service providers for implementation of safe pest management systems.
- Official IPM policies for their facility that sustain the commitment to safe pest management.

Most of the seven pilot partners have adopted an IPM policy, sustaining the facility’s commitment to IPM. The policies define IPM for the facility, require the approach for pest management, and provide details on implementation, including requirements for contractors, the role and definition of least-toxic pesticides, pesticide use notification, and staff training and performance requirements.

Through the policy development and implementation process, health care facilities assume a leadership role in defining IPM and their program, including responsibilities and expected outcomes. Facilities that have undertaken this active role have seen substantial results and improvement in pest control.

A. ENVIRONMENTAL LEADERS IN THE FIELD

From the outset, the IPM in Health Care Facilities Project recognized the importance of environmental leadership to effect positive change in the health care sector for the protection of patient, resident,

visitor, and worker health from pesticide hazards. This leadership has initiated a rigorous evaluation of existing practices, challenged institutionalized approaches to pest control, conducted thoughtful assessments of proposed contracts with pest control vendors, and provided commitment and

oversight to strive for program success. These examples of leadership have created a model for IPM transition for the health care sector in Maryland and across the U.S.

The initial pilot sites entered into the Project with an interest in evaluating their existing pest management practices and adopting “green” methods. The initial seven pilot partners are:

- Broadmead Retirement Community
- Johns Hopkins Bayview Medical Center
- Johns Hopkins Hospital
- Riderwood Retirement Community
- Sheppard and Enoch Pratt Hospital
- Springfield Hospital Center
- University of Maryland Medical Center

The six pilot partners that have joined the project in 2008 are:

- Harbor Hospital
- Mercy Hospital

Most of the seven pilot partners have adopted an IPM policy, sustaining the facility’s commitment to IPM.

- Forbush School (operated by Sheppard Pratt),
- Levindale Hebrew Geriatric Center and Hospital
- Sinai Hospital
- Copper Ridge

B. EVALUATION CRITERIA

In evaluating pest management practices and transitioning to IPM, the Project staff looked for elements in the facilities' pest management program that incorporate effective IPM strategies, including:

- effective sanitation and maintenance programs that prevent pest activity attracted by food sources, harborage or entryways;
- restrictive allowable chemical product list based on health and environmental criteria; and,
- communication and coordination among facility departments and with the pest control vendor, governed by a clear IPM policy and plan.

(i) Effective Sanitation and Maintenance.

Pest-conducive areas, the focus of walk-through assessments, evaluate the following areas.

- Trash handling/compactors
- Soil/utility areas
- Staff lounges and break rooms
- Receiving and loading areas
- Storage areas
- Food preparation
- Dishwashing
- Leaking pipes and drains in general
- Independent food vendors (eg, food courts, where they operate)
- Elevator shafts
- Cluttered areas and stored food in offices

Key elements evaluated included the following:

Exterior and Entryways

- Door sweeps and seals need to be checked on each exterior door to verify a tight seal. Door sweeps close the gap between the bottom of the door and the door sill, and exclude mice and insects, reduce energy loss and costs, and prevent windblown dirt from entering the facility. Proper installation, inspection, and maintenance are essential to avoid gaps and pest entry.
- Corrugated metal and beam overhangs, and light fixtures over entryways are potential bird roosts and should be checked regularly for signs of bird activity. Mechanical deterrents including spikes, wire and non-drying sticky barriers can be used to deter bird roosting or nesting.
- Exterior lighting should be installed on poles away from the building to avoid attracting insects to the building at night. Yellow or sodium-vapor bulbs are less attractive to insects.
- Entryway floor mats should be sufficiently long to allow five full steps on the mat(s) prior to stepping on the floor. This length maximizes the amount of dirt removed from shoes.

Plumbing/Mechanical/Electrical

- All plumbing, piping, and electrical penetrations through walls and floors should be sealed to eliminate pest entryways, harborage, and transit through the facility. Sealing will also reduce energy loss and fire hazard/spread. Sealed escutcheons are most effective.

- Seal around all fixtures, bulletin boards, electrical panels, bumper guards, etc. with caulk. Start in one corner of a room and continued around the entire room, and then systematically work through the room to ensure all opening are sealed.
- Sumps should be sealed to prevent fly breeding and access by cockroaches.

Storage Areas

- Bottom shelf of shelving units should be at least 6” above floor to allow for ready cleaning and inspection.
- Inspection/cleaning aisles of at least 6” should be provided between shelf units or any stored items and walls. This ideal needs to be balanced with safety, e.g., depending on design, shelf units may need to be secured to wall to prevent tipping. No products should be stacked against walls.
- Ceiling tiles should always be maintained in place to prevent pest access into the suspended ceiling area.
- Remove all incoming product from cardboard boxes on receipt and remove cardboard immediately to a recycling dumpster. Do not store items in cardboard inside the facility. Cardboard is an ideal refuge, food source and egg-laying site for cockroaches.

Trash Handling

- Trash and recycling dumpsters and receptacles should be placed as far from building as possible to avoid attracting pests to the facility and entryways.
- Dumpsters should be maintained in clean condition.
- Contracts with waste handlers should include clear provisions for dumpster cleaning or replacement as needed.
- Receptacles with spring-loaded doors prevent pest access.
- Tear-resistant trash and recycling receptacle liners help keep receptacles and dumpsters clean. Trash receptacles should be emptied daily.

Drains

- Fill all drains with clean water on a regular basis. A dry drain allows cockroaches access to and from sewer.
- Brush or pressure washing of floor drains can launch bacteria (e.g., listeria) into the air when brushed or pressure washed. If the facility uses pressure washing for drains, all food in the area should be stored prior to the drain servicing, and all food-contact surfaces in the area should be cleaned afterward to remove any resettled microorganisms. Alternatively and ideally, after an initial clean out, a weekly service with an enzyme-based cleaner can help keep the drains clean and open.

Long-term solutions to pest problems are the rule for IPM at health care facilities.

Receiving/Loading Areas

Ensure sanitation and maintenance in hallways leading to loading docks. Floors and walls should be kept clean and painted. Trash carts should be cleaned on a regular basis.

Food Preparation Areas

Areas evaluated for the following particular concerns:

- Standing water from leaking pipes and around drains
- Complete floor cleaning – Ensure that mopped floors are not pushing dirt and grime to corners and baseboards of hard to reach areas, rather than mopped up.
- Cleaning and maintenance of ice machines
- Cleaning around and under floor ramps for handtruck access to cold storage units, warming racks, etc.

Independent Food Vendors

While independent food vendors that lease space in a facility (e.g., a food court) are under the jurisdiction of local health inspectors and authority, the facility should require lessees to conform to the facility's IPM standard, followed up with regular inspection by the facility.

General Cleaning and Clutter Removal

Assign responsibility for cleaning and clutter control in neglected areas and conduct regular supervisory visits of these including:

- Floor drains throughout
- Hallway to loading dock and trash compactor
- Loading dock area
- Laundry area
- Storage rooms
- Food court and other vendor locations serving food, including vending areas
- Staff rooms including food storage (refrigerators)

Soil/utility rooms

- In addition to the care standard for pipes and drains, mops should be properly stored hanging head up.
- There should be no standing water in a sink or bucket in these rooms. Consider switching to microfiber mops that dry quickly.

(ii) Allowable Least-Toxic Chemicals

Long-term solutions to pest problems are the rule for IPM at health care facilities (and elsewhere).

While long-term solutions usually require more involvement and cooperation from the client facility to improve sanitation and exclusion, it is incumbent upon pest service providers to provide expertise, communicate IPM needs to facility managers, and adhere to an approach to IPM that minimizes use of harmful pesticides. At a minimum, the IPM approach should:

- Employ only defined least-toxic pesticides (See Appendix 3), only as a last resort after reasonable non-chemical interventions have been exhausted, and only in response to a pest sighting.
- Eliminate interior spray applications of pesticide. These are ineffective and unnecessarily expose applicators, staff and patients to toxic chemicals.
- Use more effective bait products, but only if non-chemical measures are inadequate to manage an ongoing problem.
- Make extensive use of insect monitors in food service and other pest-vulnerable areas. These should be checked on each service provider visit, and increased in problem areas. If a pest is captured, the service provider should determine if it is an isolated introduction or a sign of re-infestation, and identify conducive conditions that need to be resolved.
- For structural pests, preferred formulations include non-volatile gels, baits or pesticides contained within tamper-resistant bait stations. Spray-applied liquids are rarely if ever needed and increase potential for staff and patient exposure.

iii. Communication, Coordination and Policy.

Staff Education

At hiring, new staff should receive training on their role in the facility's IPM program. Food service, housekeeping, cleaning, and maintenance staff should receive more detailed training on why minimizing hazards from both pests and pesticides is important, and how their responsibilities specifically relate to pest prevention. All staff should receive continuing education on their role in pest management.

Design and Construction

Pest entry and pest-conducive conditions can often be prevented at the design and construction stage. For example, outdoor lighting on poles away from doors rather than on the building near doors will not attract flying insects to the building. Many of these issues are particularly frustrating for facility managers and service vendors responsible for conditions that could have been fixed. Pest management service providers should, at a minimum, review plans for any new construction or renovation to reduce pest-friendly conditions, including landscaping. This practice can save thousands of dollars in remediation costs for birds, rodents and other pests that can take advantage of pest attractive design features. Vendors also should review construction in progress and at hand-over to ensure pest-proofing design features are implemented properly, including verifying that all plumbing, electrical and other penetrations are sealed both inside and outside, and that the contractor is not disposing of trash or construction debris in walls, crawl space, etc. where they will lead to pest problems later.

In addition, active construction and renovation sites present a host of pest-conducive conditions and pressures on a facility. Construction zones should be strictly policed for trash, pest harborage, and entry points.

Client Communication

The shift from an outsource to a partnering model for effective IPM is most readily apparent in changes in client communication for vendors. An effective working relationship includes regular communication between vendor and client that has pest prevention at its core. Hand-held electronic reporting devices that provide real-time information on pest sightings and inspections to facility managers are a great tool. A service call should always include a debriefing of the facility manager in charge, supplemented by (usually) monthly meetings dedicated to identifying and solving current pest concerns.

Facilities that contract for pest management services should have IPM-based structural pest control bid and contract policies and rules in place.

The pest complaint logging system is a primary tool for the success of the IPM program, and should correspond to the overall goals of continual communication between the facility and the vendor. Pest logging forms should emphasize inspection, monitoring and pest identification and prevention as primary strategies. The form should provide plenty of room for detailed comments on the specific location of pests sighted within a building, and for technician recommendations for prevention.

Service tickets at a minimum should include date, technician, time in and out, pesticide product used, amount, room and location, method of application and target pest. Target pest should be as specific as possible, e.g., species of ants and cockroach. Service tickets should include notations regarding pest-conducive conditions or recommendations for corrective actions, e.g., “plant filled with fungus gnats, please remove plant” and “wash inside of trash cans to reduce fly problems.”

IPM Policy, Contract, and Plan

Ultimately, the effectiveness of an IPM program is tied to a clearly articulated IPM policy, contract, and plan. These administrative elements are essential to implementation of an effective IPM program.

- An IPM policy for the facility that defines IPM as relying on non-chemical pest prevention with a goal of effective pest control without toxic chemicals and only the use of least-toxic pesticides as a last resort, carried out with an emphasis on communication, coordinator and staff education;

- Contract provisions that clearly specify IPM responsibilities as well as standards; and,
- IPM plans that assign IPM communication and implementation responsibilities in detail, including frequent, regularly scheduled communication between the facility and vendor

Under the partnering model, the facility and the vendor both “own” the pest management system for the facility and operate the system as partners, recognizing that neither can be effective without the active support of the other. Responsibilities for key decisions are held jointly or clearly assigned to one or the other, and both are accountable to the other for the operation of the pest management system. In practical terms, this means that the facility and the vendor engage in ‘real-time’ communication to the extent possible regarding the operation of the pest management system, collaborate as required to make and execute decisions, and follow up in a timely manner to the needs of the pest management system.

IPM at health care facilities begins with an institutional commitment to safer pest management formalized in an IPM program. While the details of the program will reflect the particular needs, all programs share some common elements:

- **IPM policy.** A facility’s IPM policy lays the ground rules for pest management, including the prioritization on non-chemical preventive measures and intervention. A policy is generally two to three pages in length and should address staff and patient health and safety priorities, the role of pesticides in pest management, notification of pesticide applications, and general policies and practices to reduce pest-conducive conditions. The policy should be formally adopted by facility governance, and provide an effective tool for the IPM Coordinator to enforce IPM practices by vendors and employees.
- **IPM plan.** The plan should detail frequently encountered pest problems and strategies employed to manage those problems. A vendor’s plan may be adequate, but should be thoroughly reviewed, possibly by a third-party expert. The plan should clearly reflect the pest management approach required by the facility’s IPM policy. The plan should address particular known pest problems and provide details on notification procedures, communication and reporting requirements, record-keeping, and contingency planning requirements.
- **IPM Coordinator.** This individual provides day-to-day oversight for the IPM program. This person is ideally an administrator with operations management and/or risk management responsibilities, and has control over buildings and grounds maintenance, food service, cleaning and contracted pest control services, so they can compel improvements in these areas as needed. This person should participate on safety/risk management committees, and/or an IPM committee.

The IPM coordinator is responsible for interpretation of the IPM policy and plan, and typically works with an IPM or safety committee to review and revise the program and documents as needed. This individual should receive ongoing continuing IPM education by attending IPM-related sessions at healthcare industry meetings, networking with other IPM coordinators, inviting IPM experts in for in-house staff training, etc. For specific sites such as the food services, you might also consider designating an IPM site coordinator with oversight of that area.

Facilities that contract for pest management services should have IPM-based structural pest control bid and contract policies and rules in place. IPM specifications can be adapted and included in an existing contract. The emphasis is on diagnosis and long-term, preventive solutions to pest problems rather than pesticide applications. The contractor selection process should be designed to verify that the bidder can meet the standards, and oversight should be ongoing to ensure performance.

Situations where multiple vendors are operating under separate management and contracts can be awkward. All should be under similar contract specifications and oversight standards. Greater communication is needed to permanently resolve any ongoing infestation.

CHAPTER IV: CONCLUSION

The Integrated Pest Management in Health Care Facilities Project and its pilot health care facility partners are identifying management strategies to control unwanted pests without hazardous chemicals and embracing policy to codify this approach. The pilot facilities that have taken this on represent a group of leading institutions that are asking the questions necessary to protect their patients, residents, visitors, and staff. The health care sector serves a population that is especially vulnerable to chemical exposure and most of the hazardous chemicals typically used to manage pests in this setting are unnecessary with the adoption of sound and sensible IPM programs.

HEALTH FACILITY PERSPECTIVE

The Project provides third-party support in the process of evaluating existing pest management programs and technical expertise in defining criteria for engaging service providers. The experience of pilot partners reflects this process and is captured by several of the facilities in their own words.

Johns Hopkins Hospital.

Johns Hopkins Hospital's Director of Environmental Services, Chris Seale, describes the transition:

When I arrived at Johns Hopkins Hospital two years ago, I discovered significant service and quality issues with our pest control. I found that our pest control service provider had been in place for some 42 years with little progression in the realm of IPM. I am a sustainability enthusiast and was very concerned about the amount of pesticide that was being introduced into our environment both internally and externally. The Project was a great discovery, as it helped design the IPM request for proposals (RFP) and vet the proposals.

We have come a very long way in the last 18 months. We now have, what I would call, a platinum level IPM program thanks to the collaboration between Johns Hopkins, Maryland Pesticide Network, Beyond Pesticides, and our pest control vendor. We have essentially eliminated the use of pesticides and reduced our year after year's pest complaints by almost 60%.

The IPM in Health Care Facilities Project and the pilot facilities are charting a course that is at the leading edge of pest management and serves as a model for the state of Maryland and the nation.

The health care benefits are numerous. We are no longer at risk of exposing staff, visitors, or patients to toxic pesticides. We are no longer adding to the growing level of pesticides found in our communities and waterways.

I am very proud of the accomplishments here at the Johns Hopkins Hospital. I am even more proud that we have expanded the IPM project to Howard County Hospital. The synergy and momentum speaks for itself. Together we are meeting the needs of society today, while respecting the ability of future generations to meet their needs.

Springfield Hospital Center.

Springfield Hospital Center, operated by the State of Maryland, has changed its approach to pest management, reports its contract specialist, Paul Althoff.

Springfield Hospital Center (SHC), the second oldest and second largest public psychiatric hospital with an inpatient facility in Maryland (operated by the Maryland Department of Health and Mental Hygiene

(DHMH) under the direction of its Mental Hygiene Administration), contracts for its pest control services. Historically, the contract has called for conventional services by means of routine application of chemicals in addition to bait traps, etc. In 2006, the hospital elected to participate as a pilot facility for the IPM in Health Care Facilities Project. On June 1, 2008, Springfield Hospital Center awarded an IPM contract with a vendor to begin its path toward an environmentally safer environment for its patients and staff.

Hospital personnel have gained increased knowledge of IPM by participating in the Project. Project staff has provided invaluable resources and assistance in the development of the hospital's IPM contract, policy and transition. Since working with the IPM Project, the hospital has since participated in other greening efforts, to include a mercury audit conducted by MDH2E (Hospitals for a Healthy Environment) in 2007 and the creation of a green team which had its first meeting in June of this year.

Although still in its infancy at Springfield, IPM has made a difference in the way the hospital operates. Changes have already occurred in departments such as Dietetic Services in ensuring that inventory is immediately removed from cardboard to minimize the risk of infestation. The hospital's IPM Plan and Policy are continuously evolving. Our recommendations would include being patient. We have found that changes do not occur overnight. Staff awareness and training in conjunction with the assistance of Project staff and a knowledgeable contractor can lead to a successful transition to IPM.

University of Maryland Medical Center.

The Director of Health and Safety for the University of Maryland Medical Center, James Chang, says the following:

The University of Maryland Medical Center is proud to participate in the IPM process. Given the combination of the Medical Center's new and older buildings in the center of the city, pests are a continuing challenge for us. The IPM process has been eye-opening, teaching us that simple things like work practices can have a significant effect on pest reduction within our buildings. The ability to reduce pests in the hospital and surrounding buildings without the use of potentially harmful chemicals is important in our overall patient safety goal – Safest Care Anywhere™.

MANAGING A HOSPITAL THAT PROTECTS HEALTH AND THE ENVIRONMENT

The health care facility pilots want effective pest management that protects health and the environment. They are working to assess current practices, evaluate chemical use, establish effective pest control, involve staff, coordinate departments, partner with pest control service providers, and protect patients, residents, visitors, and employees. The IPM in Health Care Facilities Project and the pilot facilities are charting a course that is at the leading edge of pest management and serves as a model for the state of Maryland and the nation.

APPENDIX I: MARYLAND HOSPITAL SURVEY

Pest Problem	Pesticide Product Name	Application Site	Primary Formulation Type	Active Ingredient	Pesticide Class	Carcinogen
Ants, carpenter	Advance	Outdoor	Bait	Abamectrin	Botanical	
Cockroaches	Avert	Indoor	Gel bait			
Ants and Cockroaches	Orthene	Indoor	Gel and spray	Acephate	Organophosphate	C
Label: multiple turf insects	Talstar PL	Outdoor	Granules	Bifenthrin	Synthetic pyrethroid	C
Label: multiple turf pests	Talstar	Indoor/Outdoor	Spray			
Ants	Ant Master's Boric Acid	Indoor	Bait	Boric acid	Inorganic	
Ants	Drax	Indoor	Bait			
Cockroaches	ECO 2000 GR	Indoor	Bait			
Ants	In Tice Gel	Unspecified	Bait			
Ants	Terro Ant Killer 11	Indoor/Outdoor	Bait			
Label: wood-destroying insects	Timbor	Outdoor	Power Sprayer			
Ants	Gourmet ant bait	Indoor	Gel bait			
Rodent Control	Final Blox	Indoor	Bait	Brodifacoum	Courmarin, rodenticide	?
Rodent Control	Weather Blok	Indoor/Outdoor	Bait and Sprayer			
Rodent Control	Talon G	Unspecified	Granules			
Rodent Control	Maki Mini Block	Outdoor	Bait	Bromadiolone	Coumarin, rodenticide	?
Rodent Control	ContraC (Blox)	Outdoor	Bait			
Termites	Phantom	Indoor	Spray	Chlorfenapyr	Pyrazole	C
Crawling, flying and wood infesting insects	Tempo Ultra WP	Indoor	Spray	Cyfluthrin	Synthetic pyrethroid	
Ants and Cockroaches	Demon EC	Unspecified	Spray	Cypermethrin	Synthetic pyrethroid	C
Ants and Cockroaches	Delta Dust	Indoor	Dust	Deltamethrin	Synthetic pyrethroid	
Ants and Cockroaches	Suspend SC	Indoor	Spray			
Rodent Control	Generation mini blocks	Outdoor	Bait	Difethialone	Rodenticide	?

Carcinogen: B2 = Probable C = Possible D = Not classifiable E = Evidence of non-carcinogenicity ED = Endocrine Disruptor

PESTICIDE USAGE AND TOXICITY SUMMARY

Reproductive Toxin	Birth/ Developmental Toxin	Neuro-toxin	ED	Liver or Kidney Damage	Sensitizer/ Irritant	Environmental effects	Note
X	X	X	?		X	Toxic to fish and aquatic life	
X		X	?		X	Highly toxic to bees; moderately toxic to birds.	
		X	?			Highly toxic to bees, fish and aquatic organisms; moderately toxic to birds.	
X	X		?		X	High levels can harm birds, fish and frogs.	
?	X		?	?	?	Highly toxic to birds and mammals, moderate to highly toxic to aquatic organisms.	Highly acutely toxic to humans. Rodenticides have a high risk of secondary poisoning.
?	?		?	X	?	Highly toxic to birds and mammals, moderate to highly toxic to aquatic organisms.	Highly acutely toxic to humans. Rodenticides have a high risk of secondary poisoning.
			?			Extremely toxic to birds.	
X		X	?	X	X	Highly toxic to aquatic organisms and honey bees.	
X	X	X	X	X	X	Toxic to bees, fish, and aquatic organisms	
			S		X	Toxic to fish, aquatic organisms, amphibians, bees.	
?	?		?	?	?	Highly toxic to birds and mammals, moderate to highly toxic to fish and aquatic organisms.	Highly acutely toxic to humans. Rodenticides have a high risk of secondary poisoning.

X = Health Effect ? = Not Investigated or Not Enough Information to Determine

Pest Problem	Pesticide Product Name	Application Site	Primary Formulation Type	Active Ingredient	Pesticide Class	Carcinogen
Rodent Control	Ditrac Powder	Indoor/Outdoor	Dust	Diphacinone	Indandione (anticoagulant rodenticide)	
Termites	Termidor SC	Indoor/Outdoor	Spray	Fipronil	Pyrazole	C
Ants	Maxforce	Indoor	Gel bait			
Ant, Carpenter	Maxforce	Indoor	Bait station			
Cockroaches	Maxforce FC	Indoor	Gel Bait			
Cockroaches	Combat Source Kill	Unspecified	Solid Bait	Hydra-meth-ylnon	Insecticide	C
Ants	Maxforce	Indoor	Bait			
Cockroaches	Maxforce	Indoor/Outdoor	Bait station			
Roach Control	Gentrol IGR	Indoor	Spray	Hydroprene	Botanical	D
White grubs	MERIT	Outdoor	Granular	Imidacloprid	Chloro-nicotinyl	E
Cockroaches	PreEmpt	Unspecified	Gel bait			
Broad spectrum turf insecticide	Demand CS	Indoor	Spray Foam	Lambda Cyhalothrin	Synthetic pyrethroid	D
Wasps	Wasp-Freeze	Outdoor	Spray	Phenothrin (Sumithrin)	Synthetic pyrethroid	
Broadleaf weeds	Barricade	Outdoor	Liquid	Prodiamine	2,6-Dinitroaniline, herbicide	C
Label: Ants and Cockroaches	Baygon Bait	Unspecified	Granules	Propoxur	Carbamate	B2
Ants	565 Plus XLO	Unspecified	Aerosol	Pyrethrin	Pyrethrin	Likely
Crawling and Flying Insects	CB-80 Pyrethrin	Indoor	Spray	Piperonyl Butoxide and Pyrethrin	Synergist (Pyrethrin)	C
Cockroaches	Speckoz Pyrocide	Indoor	Flusher			
Ants, flies, cockroaches	Nyguard	Indoor	Spray	Pyriproxyfen	Unclassified	Not likely
Ants	Advance Dual Choice Ant Bait	Unspecified	Bait	Sulfluramid	Unclassified	?
Wasps	Speckoz Multicide Wasp	Outdoor	Spray	Tetramethrin (and d-Phenothrin)	Synthetic pyrethroid	C
TOTAL Health Effects						11

Carcinogen: B2 = Probable C = Possible D = Not classifiable E = Evidence of non-carcinogenicity ED = Endocrine Disruptor

PESTICIDE USAGE AND TOXICITY SUMMARY, CONTINUED

Reproductive Toxin	Birth/ Developmental Toxin	Neuro-toxin	ED	Liver or Kidney Damage	Sensitizer/ Irritant	Environmental effects	Note
			?	X		Highly toxic to birds and mammals, moderate to highly toxic to fish and aquatic organisms.	Highly acutely toxic to humans. Rodenticides have a high risk of secondary poisoning.
		X	X	X	X	Toxic to birds, bees, fish and aquatic organisms	
X	X		?	X	X	Toxic to fish and aquatic organisms.	
?	?		?		X	Environmental fate is unavailable.	
X			?			Potential leacher, toxic to birds, bees, fish, and aquatic organisms.	
		X	S		X	Toxic to bees, fish, and aquatic organisms	
		X	S	X		Extremely toxic to aquatic organisms, moderately toxic to birds.	
			X				
		X	?	X		Potential leacher, toxic to bees and birds.	
X		X	?	X	X	Toxic to fish/aquatic organisms.	
X		X	?	X	X	Toxic to fish/aquatic organisms.	
?	?	?	?	?	?	Toxic to fish and aquatic invertebrates.	
X	X		?			Highly toxic to birds and toxic to aquatic organisms.	
		X	?			Toxic to fish and aquatic organisms.	
10	5	12	6	10	12		

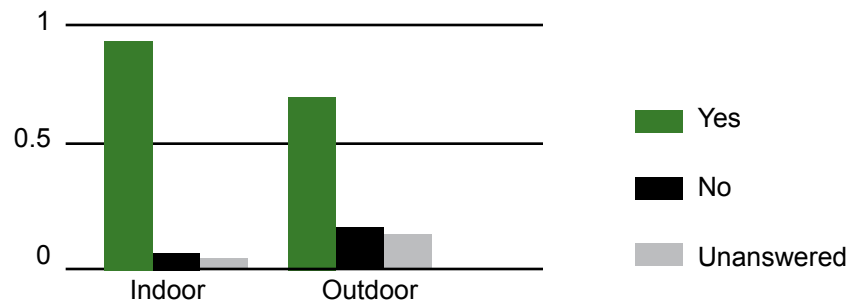
X = Health Effect ? = Not Investigated or Not Enough Information to Determine

APPENDIX 2: ANSWERS TO SURVEY QUESTIONS

PART I

1. Do you have a contract with a pest control company for pest management? Indoor and Outdoor?

Indoor:	Yes: 41	No: 2	Unanswered or did not know: 1
Outdoor:	Yes: 31	No: 7	Unanswered or did not know: 6



2. If you contract with a pest control company:

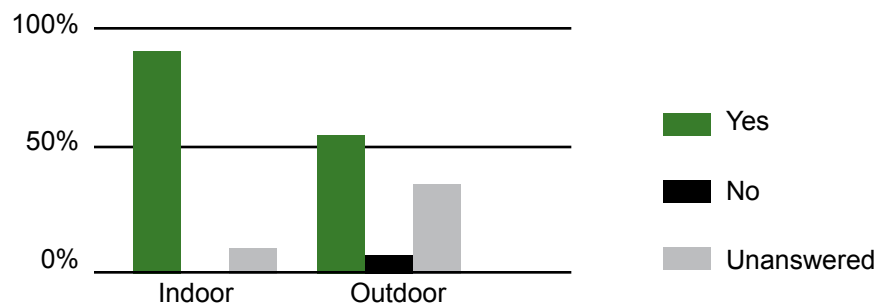
a. Who monitors the company's performance?

Facility Manager:	21
Environmental Services:	9
Facility Maintenance Staff or general staff:	6
Housekeeping Director:	2
Grounds Supervisor:	1
Facility Staff entomologist:	1
Unanswered:	4

In some cases it was a combination, such as environmental and food services or director of facility maintenance and plant operations.

b. Does the company state that it uses an IPM approach?

Indoor:	Yes: 40	No: 0	Unanswered or did not know: 4
Outdoor:	Yes: 25	No: 3	Unanswered or did not know: 16



c. Has the company provided you with pest management plan for your facility?

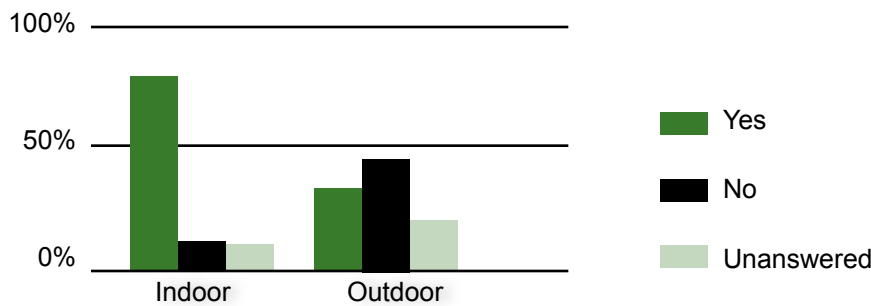
Indoor: Yes: 39 No: 1 Unanswered or did not know: 4
 Outdoor: Yes: 26 No: 4 Unanswered or did not know: 14

d. Does your facility's pest management plan include the use of chemical pesticide products inside the facility?

Yes: 35 No: 5 Unanswered or did not know: 4

e. Does your facility's pest management plan include the use of chemical pesticide products on facility lawns and landscapes?

Yes: 15 No: 20 Unanswered or did not know: 9



f. Has the company alerted you to the potential acute and long-term health effects of the pesticides it uses?

Indoor: Yes: 28 No: 8 Unanswered or did not know: 8
 Outdoor: Yes: 16 No: 6 Unanswered or did not know: 22

g. Does the company provide you with material safety data sheet (MSDS) for you to keep on file and make available to staff for all pesticides used in your facility or on the facility lawns and landscapes? And where are they kept?

Indoor: Yes: 39 No: 2 Unanswered or did not know: 2 N/A: 1
 Outdoor: Yes: 27 No: 2 Unanswered or did not know: 15

Are the MSDS sheets made available to the public?

Yes: 35 No: 2 Unanswered or did not know: 7

3. If your pest management is done in-house:

See Part 1, Question 1. Two respondents indicated that they did not contract their indoor pest management and seven indicated that they did not contract their outdoor pest management. Only those respondents are calculated below although others answered in this in-house section.

a. Do you use an IPM approach?

Indoor: Yes: 1 No: Unanswered or did not know: 1
 Outdoor: Yes: No: Unanswered or did not know: 7

b. Do you have a pest management plan for your facility?

Indoor: Yes: 1 No: Unanswered or did not know: 1
 Outdoor: Yes: No: Unanswered or did not know: 7

c. Does your facility's pest management plan include the use of chemical pesticide products inside the facility?

Indoor: Yes: 1 No: Unanswered or did not know: 1

d. Does your facility's pest management plan include the use of chemical pesticide products on the facility lawns and landscapes?

Outdoor: Yes: No: 2 Unanswered or did not know: 5

Are you aware of resources regarding information about the potential acute and long-term health effects of the pesticides it uses?

Yes: 1 No: Unanswered or did not know: 8

f. Do you keep MSDS on file and make available to staff for all pesticides used in your facility or on the facility lawns and landscapes?

Indoor: Yes: No: Unanswered or did not know: 2

Outdoor: Yes: No: Unanswered or did not know: 7

Are they made available to the public?

Indoor: Yes: No: Unanswered or did not know: 2

Outdoor: Yes: No: Unanswered or did not know: 7

If you answered yes, how are they available:

None answered yes.

4. Are any of the following methods of pest management used in the facility?

RESPONDENTS CLAIMING

THIS PRACTICE	IPM PRACTICE
	Structural
41	Seal openings (cracks and crevices)
35	Door Sweeps
27	Repair leaking pipes
1	Caulking if needed to prevent pest entry
1	All methods of exclusion/harborage reduction
1	Air Curtain
	Mechanical
35	Traps (glue traps for mice and bugs)
14	Vaccuming
1	Hand pulling weeds
1	Zappers

RESPONDENTS CLAIMING

THIS PRACTICE	IPM PRACTICE
	Sanitation
28	Empty Trash
22	Wash recycling bins
23	Floor drain covers
15	Power wash cafeteria kitchen
5	Clean floor drains

5. What pest problems did the facility manage in the past 12 months?

Ants, cockroaches and rodents (mice and rats) were the predominant pest problems that were identified.

RESPONDENTS CLAIMING

THIS PEST PROBLEM	IDENTIFIED PEST
18	Ants
1	Bird
18	Cockroaches
3	Clover mites
2	Grubs
5	Flying insects unspecified
2	Bees
1	Gnats
6	Fruit flies
2	Ladybug
13	Mice
2	Pigeons
4	Rats
14	Rodent unspecified
1	Skunks
2	Spiders
1	Termites
1	Weeds
3	No pest problems

What methods (structural, sanitation, mechanical, and chemical) were used for these problems and in what order?

See text in report.

If there have been situations when pesticides were used as the first response in the past 12 months, please briefly explain the situations.

See text in report.

Yes: 15 No: 16 Unanswered or did not know: 13

6. Are facility staff members given information and/or training on the health effects of pesticides?

Yes: 16 No: 17 In-service upon request: 3 Unanswered or did not know: 8

7. Do you provide any of the following forms of notification to staff when pesticides are used in the facility?

Flyers in staff boxes: 1

E-mail: 1

Verbal notification: 3

Advise current management in charge of area: 3

Post warning signs: 10

No form of notification: 4

Did not answer and didn't use pesticides: 11

Did not answer: 11

8. Do you provide any of the following forms of notification to patients when pesticides are used in the facility?

Did not use pesticides in the presence of patient or in rooms: 4

Posted notification (2 with handouts): 4

Provided material safety data sheets if requested: 4

Moved patients: 1

Verbal notification: 2

Patient Handout: 1

No form of notification: 6

Did not answer and didn't use pesticides: 4

Did not answer: 18

Notification- Outdoor

9. Do you post warning signs when pesticides are used on the facility's lawns and landscapes? (Of the 15 that use pesticides outdoors)

Yes: 10 No: 5

10. Do you provide other forms of notification to staff, patients, or others when pesticides are used on hospital lawns and landscapes? To whom? (Of the 15 that use pesticides outdoors)

Yes: 4 No: 11

11. If you do provide notification (only four provided notification):

a. Do you provide information on acute health effects?

Yes: 2 No: Unanswered or did not know: 2

b. Do you provide information on acute or chronic health effects?

Yes: 2 No: Unanswered or did not know: 2

Record keeping

12. Does anyone keep records of pesticides use in the facility?

Indoor: Yes: 36 No: 1 No pesticides used: 3 Unanswered or did not know: 4

13. If yes, who keeps the records? (Title and position of person)

Administrative Personnel: 3
Business Personnel: 1
Community Health Branch: 1
Contractor: 8
Environmental Services Personnel: 7
Facility Manager: 1
Housekeeping Personnel: 2
Maintenance Director Personnel: 4
Plant Operations Director or Personnel: 1
Quality control logbook or logbook: 6
Safety Personnel: 1
Director unspecified: 1
Unanswered: 8

14. If records are kept by a contractor, are copies also kept at the facility?

Yes: 37 No: 4 Unanswered or did not know: 3

15. Does anyone keep records of pesticides on the facility's lawns and landscapes?

Outdoor: Yes: 17 No: 1 No pesticides used: 12 Unanswered or did not know: 14

If yes, who keeps the records? (Title and position of person)

Administrative Personnel: 1
Business Personnel: 1
Contractor: 6
Environmental Services Personnel: 1
Facility Manager: 2
Housekeeping Personnel: 1
Maintenance Director Personnel: 3
Plant Operations Director or Personnel: 1
Safety Personnel: 1
N/A, no pesticides used: 13
Unanswered: 14

17. How long are the records kept?

One year: 2
Two years: 6
Three years: 14
Five years: 4
Seven years: 2
Ten years: 1
Permanent: 1
Unknown: 2
Unanswered: 12

18. What are the approximate cost per year for your facility pest management? Indoor and Outdoor.

Indoor Pest Management Costs

NUMBER OF BEDS	INDOOR IPM COSTS (CONTRACTED)	INDOOR IPM COSTS (IN HOUSE)
60 -75	\$1756 - \$3000	No information
76 -139	No information	No information
140-160	\$1900-\$7500	\$4150
175	\$3500	No information
275-300	No information	No information
350- 375	\$4798-\$15,000	No information

Outdoor Pest Management Costs

The costs for lawn care ranged from \$1,100 to \$12,500.

APPENDIX 3: LEAST TOXIC PESTICIDES

Least toxic pesticides are any pesticide or pesticide product ingredients, which, at a minimum, have not been classified as or found to have any of the following characteristics:

(1) Toxicity Category I or II by the United States Environmental Protection Agency (EPA). These pesticides are identified by the words “DANGER” or “WARNING” on the label.

(2) A developmental or reproductive toxicant as defined by the State of California Proposition 65 Chemicals Known to Developmental or Reproductive Harm.

(3) A carcinogen, as designated by EPA’s List of Chemicals Evaluated for Carcinogenic Potential (chemicals classified as a human carcinogen, likely to be carcinogenic to humans, a known/likely carcinogen, a probable human carcinogen, or a possible human carcinogen), the International Agency for Research on Cancer (IARC), U.S. National Toxicology Program (NTP), and the state of California’s Proposition 65 list. Any of the following classifications shall deem the chemical a carcinogen and unacceptable:

- Known to the State of California to Cause Cancer (California)
- Group A: Human Carcinogen (US EPA 1986 category)
- Group B: Probably Human Carcinogen (US EPA 1986 category)
- Group C: Possible Human Carcinogen (US EPA 1986 category)
- Known Carcinogen (US EPA 1996 category)
- Likely Carcinogen (US EPA 1996 category)
- Carcinogenic to Humans (US EPA 1999 category)
- Likely to be Carcinogenic to Humans (US EPA 1999 category)
- Suggestive Evidence of Carcinogenicity (US EPA 1999 category)
- Known to be Human Carcinogens (NTP)
- Reasonably Anticipated to be Human Carcinogens (NTP)
- Group 1: Carcinogenic to Humans (IARC)
- Group 2A: Probably Carcinogenic to Humans (IARC)
- Group 2B: Possibly Carcinogenic to Humans (IARC)

(4) Neurotoxic cholinesterase inhibitors, as designated by California Department of Pesticide Regulation or the Materials Safety Data Sheet (MSDS) for the particular chemical,

(5). Known groundwater contaminants, as designated by the state of California (for actively registered pesticides) or from historic groundwater monitoring records (for banned pesticides).

(6) Pesticides formulated as dusts, powder or aerosols, unless used in a way that virtually eliminates inhalation hazard (for example, applied to cracks or crevices and sealed after the application, or as a directed spray into the entrance of an insect nest).

(7) Nervous system toxicants, including chemicals such as cholinesterase inhibitors or chemicals associated with neurotoxicity by a mechanism other than cholinesterase inhibition, or listed on:

- Toxics Release Inventory (TRI), EPA EPCRA Section 313 (Identified as “NEUR” on Table 1)
- EPA Reregistration Eligibility Decisions (RED)
- Insecticide Resistance Action Committee (IRAC) Mode of Action Classification:
 - Acetylcholine esterase inhibitors;
 - GABA-gated chloride channel antagonists;
 - Sodium channel modulators;
 - Nicotinic Acetylcholine receptor agonists /antagonists;

- Nicotinic Acetylcholine receptor agonists;
- Chloride channel activators;
- Octopaminergic agonists;
- Voltage-dependent sodium channel blockers; or
- Neuronal inhibitors (unknown mode of action).

(8) Endocrine disruptors, which include chemicals that are known to or likely to interfere with the endocrine system in humans or wildlife, based on the European Commission (EC) List of 146 substances with endocrine disruption classifications, Annex 13 (and/or any subsequent lists issued as follow-up, revisions, or extensions).

(9) (Regarding outdoor use) Adversely affects the environment/wildlife, based on:

1. Label precautionary statements including “toxic” or “extremely toxic” to bees, birds, fish, aquatic invertebrates, wildlife or other non-target organisms, unless these organisms are the target pest and/or environmental exposure can be virtually eliminated.
2. Pesticides with ingredients with moderate or high mobility in soil, according to the Groundwater Ubiquity Score (GUS), or with a soil half-life of 30 days or more (except for mineral products). Persistence and Soil Mobility procedures appear below.
 - a) If GUS (Groundwater Ubiquity Score) cannot be found, we search for the aerobic soil half-life and soil-binding coefficient Koc. GUS is then calculated from the formula: $GUS = \log_{10}(\text{half-life}) * (4 - \log_{10}(Koc))$.

(10) Has data gap or missing information in EPA registration documents, including pesticide fact sheets, or EPA reregistration eligibility decisions, which EPA is requiring the registrant to fulfill.

(11) Contaminants and metabolites recognized by EPA that violate any of the above criteria.

(12) Inert or active ingredients that are Chemicals Included on EPA's List 1 (Inerts of Toxicological Concern) or EPA List 2: (Potentially Toxic, High Priority for Testing).

APPENDIX 4: PILOT FACILITIES IN THE INTEGRATED PEST MANAGEMENT IN HEALTH CARE FACILITIES PROJECT

The initial seven pilot partners joined the project in 2006:

Broadmead Retirement Community
13801 York Road
Cockeysville, MD 21030

Johns Hopkins Bayview Medical Center
4940 Eastern Avenue
Baltimore, Maryland 21224

Johns Hopkins Hospital
600 N. Wolfe Street
Baltimore, Maryland 21287

Riderwood Retirement Community
3140 Gracefield Road
Silver Spring, MD 20904

Sheppard and Enoch Pratt Hospital
6501 North Charles Street
P.O. Box 6815
Baltimore, Maryland 21285

Springfield Hospital Center
6655 Sykesville Road
Sykesville, MD 21784

University of Maryland Medical Center
22. S. Greene St.
Baltimore, MD 21201-1595

Six additional pilot partners joined the project in 2007:

Copper Ridge
710 Obrecht Road
Sykesville, MD 21784

Harbor Hospital
3001 S Hanover St
Baltimore, MD 21225

The Forbush School
11201 Pepper Rd
Cockeysville, MD 21031

Levindale Hebrew Geriatric Center and Hospital
2434 W. Belvedere Ave.
Baltimore, MD 21215

Mercy Medical Center
301 St. Paul Place
Baltimore, MD 21202

Sinai Hospital
2401 W. Belvedere Ave.
Baltimore, Maryland 21215

APPENDIX 5 – GUIDE TO CONTRACTED INTEGRATED PEST MANAGEMENT SERVICE PROVIDER OVERSIGHT

This Appendix is a brief guide to oversight of contracted pest management service providers at health care facilities, adapted by the IPM Institute for North America from a May 2005 U.S. General Services Administration document authored by Dr. Albert Greene. It provides guidance on technical and administrative criteria for evaluating contractor performance.

A pest control program can be considered as IPM if these basic criteria are met:

TECHNICAL CRITERIA FOR IPM

- The contractor's inspections for insect pests are often aided by sticky traps.
- The contractor provides detailed, site-specific recommendations for structural and procedural modifications to decrease conditions that are conducive to pest infestation and improve pest prevention.
- Pesticides are never applied by schedule. A limited number of pre-approved pesticides are used only when inspection confirms that pests are present, the pest has been accurately identified and cannot be efficiently prevented with non-chemical means. This list has been developed by reviewing available options and selecting those with minimum hazards to applicator and facility occupant health and environmental impacts. Hazards evaluated include acute toxicity indicated by the signal word on the product label (i.e., "CAUTION" signifying the least acutely toxic) and chronic toxicity including carcinogenicity, reproductive and developmental toxicity and potential for endocrine system disruption. Chronic toxicity is often but not always indicated by cautionary statements included on the Material Safety Data Sheet (MSDS) for the product.
- The credo for applying pesticides is "last resort, restraint and precision." Applications are limited to the affected area and specific to the target pest. Insecticide sprays are rarely, if ever, applied indoors.
- As a general rule, insecticides applied indoors for cockroach and ant control are bait formulations.
- As a general rule, control of flying insects indoors is accomplished by various types of traps.
- As a general rule, control of rodents indoors is accomplished by various types of traps. Rodenticide is used indoors only in extreme circumstances.
- As a general rule, methods developed for "sensitive" areas (e.g. patient rooms, surgical units, intensive care units, child care and neonatal units, food service) to reduce exposure to and toxicity of pesticides are used in all parts of the building.

ADMINISTRATIVE CRITERIA FOR IPM

- Pesticide applications are made only by state licensed and certified Pesticide Applicators, which verifies a minimum acceptable level of expertise. Copies of these certificates are kept on file by facility management and checked and updated as needed at least annually. No other personnel in the facility are permitted to bring pesticides onto the premises or to apply them.
- Copies of the labels and Material Safety Data Sheet (MSDS) for every pesticide used in the facility are readily available on request, e.g., in a file in the administrative office.
- Post notice of pesticides to be used 48 hours prior to use in central and visible location to those entering and those working in the facility. Provide contact to obtain additional information.
- The contractor makes scheduled service visits frequently enough to effectively prevent pest problems so that management and most facility occupants and users are satisfied with the level of control. Service visits ideally consist of responding to specific occupant requests followed by routine inspections.
- In a typical public building, the first part of a scheduled service visit is guided by a centralized service call system in which building occupants phone in pest control requests that are logged on a work order document. Client reporting is therefore an important pest surveillance method.

- If there is time remaining after all occupant service requests are answered, the contractor inspects areas at particular risk for pest infestation. These tend to be sites where food or waste are concentrated, are warmer or moister than typical office space, or where pests find it easy to enter the building.
- In addition to the pest control contract, which deals primarily with inspection and corrective issues, the overall pest control effort includes improvements in sanitation and exclusion throughout the facility where conducive conditions for pest infestation have been identified. Programs whose procedures often have a strong impact on pest control include structural maintenance, cleaning and waste management, food service, landscape, and patient care.
- In addition to scheduled service visits, the pest management service provider meets regularly (ideally monthly) with the facility IPM Coordinator to review the state of IPM at the facility, identify action items for preventing and eliminating conducive conditions, and give and receive updates on ongoing action items.

AT A MINIMUM, ASK THESE QUESTIONS:

- Are pests or evidence of pests frequently encountered?
- Are there obvious conducive conditions for pests?
- Is insecticide being routinely sprayed indoors? Are there obvious indoor rodenticide placements?
- Is pest control service limited to pesticide application, with little or no inspection of potential trouble spots?
- Are pesticides being used before all non-toxic means have been tried and shown to be unsuccessful?
- Are pesticides used that have “DANGER” or “WARNING” signal words on the label?
- Are many occupants dissatisfied with the pest control service?

If the answer is “no” to all of the above, the pest control program follows an IPM approach and has a high probability of success.

Integrated Pest Management in
Health Care Facilities Project
1209 N. Calvert St.
Baltimore, MD 21201

*“When an activity raises threats
of harm to human health or
their environment, precautionary
measures should be taken even if
some cause and effect relationships
are not fully established
scientifically.”*

— Precautionary Principle



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