Summary of Symptom Reports in Areas of Aerial Pheromone Application for Management of the Light Brown Apple Moth in Monterey and Santa Cruz Counties
September, October, and November 2007

Office of Environmental Health Hazard Assessment

Department of Pesticide Regulation

California Department of Public Health

April 10, 2008

Contributors

Marylou Verder-Carlos, D.V.M., M.P.V.M.
Aaron Campbell, B.S.
Amna Hawatky
Rick Kreutzer, M.D., M.P.H.
James Sanborn, Ph.D.
Robert Schlag, M.Sc.
David Ting, Ph.D.
Joy Wisniewski, Ph.D.
Nino Yanga, D.V.M., M.P.V.M.

Reviewers

George Alexeeff, Ph.D.
Joan Denton, Ph.D.
Susan Edmiston, B.S.
Anna Fan, Ph.D.
George Farnsworth, B.S.
Louise Mehler, M.D., Ph.D.
Jay Schreider, Ph.D.
Bonita Sorensen, M.D., M.B.A.
Craig Steinmaus, M.D., M.P.H.

We would like to acknowledge and express our appreciation to all agency staff who participated in the multi-agency effort to evaluate the symptom reports following aerial application of pheromone products for the management of the light brown apple moth in Monterey and Santa Cruz Counties in the fall 2007. These people offered invaluable assistance in designing a database and evaluating and analyzing all the reports received from various sources, and provided consultation on all matters related to the tasks at hand. We would like to especially thank the staff of the Office of Environmental Health Hazard Assessment (OEHHA), California Department of Pesticide Regulation (DPR), the California Department of Public Health (CDPH) and the California Department of Food and Agriculture (CDFA) for providing all the necessary information to complete the report in a timely manner.

Executive Summary:

This report is a collaboration between the Office of Environmental Health Hazard Assessment (OEHHA), Department of Pesticide Regulation (DPR) and Department of Public Health (CDPH). It summarizes the symptom reports received during and after aerial pheromone applications to control the light brown apple moth (LBAM) on the Monterey Peninsula on September 9, 10, and 11 and October 24, 25, and 26, 2007, the north Santa Cruz area of Santa Cruz County on November 8 and 9, 2007, and the North Salinas/Boronda and Prunedale/Royal Oaks areas of Monterey County on November 9 and 11, 2007 (CDFA 2007). The report provides an overview of the symptom reports consolidated from various sources that came to our attention prior to April 1, 2008. (See Addendum for additional symptom reports that were received after April 1, 2008.) Our most significant conclusion is that we were unable to link the reported symptoms with exposure to the pheromone formulation.

Background:

The presence of the LBAM, an exotic pest native to Australia, was confirmed in California in March 2007 by the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS). Since the initial LBAM confirmation, California Department of Food and Agriculture (CDFA) has conducted ongoing surveys to investigate the extent of the infestation. As of March 21, 2008 a total of 18,111 moths have been confirmed as LBAM (CDFA, 2008). Most captures are from traps in southern Santa Cruz and northern Monterey counties as well as portions of northwest Alameda, western Contra Costa, and northern San Francisco counties. A very small population is thought to exist as a result of mostly single-trap captures in Los Angeles, Marin, Napa, San Luis Obispo, San Mateo, Santa Clara, and Solano counties (CDFA, 2008).

Management Efforts:

In 2007, USDA convened the Technical Working Group (TWG) to discuss management and eradication of the LBAM. This group was comprised of several scientists from USDA-APHIS, the University of California at Riverside, Australia Department of Food and Agriculture, and HortResearch Canterbury and Ensis, New Zealand research companies. USDA and CDFA selected mating disruption using synthetic moth pheromones as the primary eradication tool, because the pheromones are less environmentally harmful than highly toxic, broad-spectrum insecticides (e.g., chlorpyrifos) (Johnson et al., 2007; TWG, 2007). The pheromones do not cause direct harm to the moths. Instead, they mimic the scent of female moths, thereby confusing male moths and preventing them in most cases from finding and mating with females.

Toxicology of Checkmate Products:

The products CDFA used for LBAM eradication in Monterey and Santa Cruz counties were Checkmate OLR-F®, and Checkmate LBAM-F®. On October 31, 2007, DPR and OEHHA submitted a consensus report to the agency secretaries of the California Environmental Protection Agency, the California Health and Human Services Agency, and CDFA. This report summarized toxicity information on the pheromone active ingredients and the fully formulated products used to eradicate LBAM. The report

concluded, "The toxicity data on the pheromones and on microencapsulated products suggest the possibility that exposure to a sufficient amount of airborne Checkmate microcapsule particles could result in some level of eye, skin, or respiratory irritation. However, as the product is diluted and applied over a large area, the degree of exposure as well as the potential for irritation should decrease significantly."

A DPR study and analysis found that about 3 ounces of the Checkmate formulation were deposited per acre within the aerial-application areas (Schreider and Kim, 2007; Wofford, 2008; Segawa, 2008). According to Suterra LLC, the manufacturer of Checkmate, about 72 percent of the formulation consists of water, which indicates that less than one ounce of pheromones and other substances (besides water) in the formulation were deposited per acre. The consensus statement said, "Because the application rate was extremely low, it is likely that exposure occurred at levels below those that would be expected to result in health effects."

Results and Discussion:

As symptoms were reported following the spraying, we have carefully reviewed the symptom reports that we received. We compiled a total of 643 symptom reports from various sources, including physicians, a CDFA call center, and various Web sites. Many individuals reported their symptoms to more than one of these sources. After eliminating duplicate reports and reports regarding something other than symptoms in humans, we analyzed a total of 463 reports of human symptoms. Of the 463 reports, 266 (57%) were from Monterey County, 167 (36%) were from Santa Cruz County and 9 (2%) were from Santa Clara County. The county was not identified in 21 (5%) reports. Forty-four of the reports (9.5%) utilized the state's Pesticide Illness Report (PIR) Form, which local health officers use for known or suspected pesticide-related illness reported by physicians.

Respiratory symptoms (such as, cough, shortness of breath, runny nose, upper respiratory irritation/pain, and wheezing) were predominant, being cited in 321 (70%) of the 463 reports. Among those who sought medical attention, 62 of 74 (84%) reported respiratory symptoms. The PIRs indicated seven diagnoses of asthma exacerbation, two of asthma, and one of reactive airway disease. The remaining PIRs indicated many of the general respiratory symptoms cited above, along with headaches and diarrhea.

It is not possible to determine whether or not there is a link between any of the reported symptoms and the aerial spraying. First, medical tests are not available to diagnose or confirm that an illness resulted from exposure to the pheromone formulations of Checkmate OLR-F and LBAM-F. Second, less than 25% of the symptom reports identified either the date or the location of exposure. This information is critical to ascertaining whether reported symptoms might plausibly have been caused by exposure to the Checkmate compounds. Third, reports from medical providers, which provide valuable corroborating evidence (i.e., date of onset of illness, date of exposure, location where exposure occurred, description of exposure circumstances, individual's activity during exposure, and any medical diagnosis), were submitted for fewer than 10% of the reports. Fourth, any likely human exposures to the Checkmate compounds would be very low, based on DPR estimates (Schreider and Kim, 2007) and monitoring data obtained during the aerial applications (Wofford, 2008).

Fifth and finally, the reported symptoms are nonspecific and, are quite common among the general population. For example, in 1991, the Behavioral Risk Factor Surveillance System Survey (BRFSS), sponsored by the U.S. Centers for Disease Control and Prevention and administered by CDPH, indicated that at any given time within a seven-day period, an average of about 150 to 250 per 1000 adult Californians experience irritated eyes, wheezing or headache without attributing it to any specific cause. Given the range of causes for these symptoms and the large number of individuals expected to experience such symptoms at any given time, the symptoms in the 463 reports cannot be clearly attributed to any specific cause.

The population within the application areas is approximately 392,582, with Monterey-Seaside counted twice since aerial applications occurred there twice. The crude reporting rate for symptoms obtained around the time of the aerial spraying was 1.2 illnesses per 1000 individuals (number of reported illnesses/population in all application sites). Since the LBAM symptom reports were obtained passively through complaints submitted by affected individuals, it does not represent an actual illness rate and cannot be directly compared to the results of the BRFSS. However, the high background rate of irritation symptoms in the general population highlights the difficulty in attributing the symptoms reported after the aerial spraying to a specific cause.

Conclusion:

More than 90 percent of the 463 symptom reports do not contain adequate information for us to determine whether or not there is a link between the reported symptoms and the Checkmate applications. In order to look for a relationship between the reported symptoms and exposure to the pheromone spray, we need specific data, such as to when and where the exposure occurred, how soon after exposure the person experienced symptoms, when the person visited the doctor, and the list of symptoms. In addition, due to the high background rate of common symptoms experienced in the general population, combined with the very low pheromone application rates, we were unable to link the symptoms with exposure to the pheromone formulation.

OEHHA, DPR, and CDPH are currently designing a program for collecting symptom and illness reports related to future LBAM eradication efforts. In order to improve the quality of information obtained, the program will encourage people to call a single location or visit their doctors if they think they have been exposed to and are ill from any LBAM eradication products. Training will be offered to physicians on how to recognize and report known or suspected pesticide-related illness. By collecting complete and timely reports in a standardized manner, we can detect any events that need more careful follow-up to determine if any unexpected health events occur from LBAM eradication efforts.

Recommendations:

OEHHA, DPR and DPH are currently preparing to implement these recommendations in conjunction with CDFA's planned 2008 LBAM aerial applications in Monterey and Santa Cruz counties and the San Francisco Bay Area.

1. Have clear communications to local government officials and the public on the importance and effectiveness of the eradication efforts, available information on any potential health risks associated with the pheromone formulation to be used, and steps that individuals can take to minimize their potential exposure to the formulation.

2. Provide information and recommendations for people who are worried about their respiratory health or consider themselves chemically sensitive, and who may want to make a special effort to avoid exposure to the formulation.

3. Coordinate effectively with local health agencies, other state agencies and elected officials on collecting illness reports.

4. Establish a centralized system for collecting and analyzing citizen symptom and illness reports, and establish an effective data-sharing system among health and regulatory agencies.

5. Communicate effectively with community health care providers on the recognition of pesticide-related illnesses and symptoms and the requirements for reporting pesticide illnesses.

Addendum

On April 1, 2008, we received an additional 24 symptom reports. Those cases were also evaluated. Consequently, 487 reports were received from all sources as of April 1, 2008. The new symptom reports do not significantly alter the statistical information, discussion or conclusions presented in this document.

Summary of Symptom Reports in Areas of Aerial Pheromone Application for Management of the Light Brown Apple Moth in Monterey and Santa Cruz Counties
September, October, and November 2007

Office of Environmental Health Hazard Assessment
Department of Pesticide Regulation
California Department of Public Health

A. Purpose of Report

This report was developed under the authority defined in Food and Agricultural Code section 11501 *et seq.*, and California Health and Safety Code sections 59015, 100325, 100335 and 131085. The Department of Pesticide Regulation (DPR) is required to protect public health and safety and the environment from hazards associated with pesticides (Food and Ag. Code section 11501 *et seq.)*. The Office of Environmental Health Hazard Assessment (OEHHA) is authorized to investigate environmental sources of morbidity and mortality, and the effects of conditions and circumstances on the public health (Health and Safety Code section 59015[1]). Similarly, the California Department of Public Health (CDPH) is authorized to initiate special investigations of the sources of morbidity and mortality and the effects of conditions and circumstances on the public health (Health and Safety Code, section 100325).

This report summarizes the symptom reports received during and after aerial pheromone applications conducted by the California Department of Food and Agriculture (CDFA) to control the light brown apple moth (LBAM) on the Monterey Peninsula on September 9, 10, and 11 and October 24, 25, and 26, 2007; the north Santa Cruz area of Santa Cruz County on November 8 and 9, 2007; and the North Salinas/Boronda and Prunedale/Royal Oaks areas of Monterey County on November 9 and 11, 2007 (CDFA 2007). The report provides an overview of the symptom reports consolidated from various sources that came to our attention prior to April 1, 2008. (See Addendum for additional symptom reports that were received after April 1, 2008.)

Because of numerous data and study design limitations, this report should not be considered a thorough epidemiological exploration. By summarizing information on the symptom reports that were filed during and after the 2007 applications, this report may help in planning for additional LBAM eradication applications that may be scheduled and to address some of the concerns expressed by residents of the spray area. Because of statutory and ethical restrictions regarding disclosure of confidential medical or personal information, no information is included that by itself or in combination with other data reveals the identity of any individual.

[1] Health and Safety Code section 59015 was established by the Governor's Reorganization Plan (Gov.Reorg.Plan No. 1 of 1991, § 22, eff. July 17, 1991) which created CalEPA, transferred OEHHA to the new Agency and transferred certain responsibilities from the Department of Health Services to OEHHA.

B. Background

Infestation description

The presence of LBAM, an exotic pest native to Australia, was confirmed in California in March 2007 by the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) (see Figure 1). Since the initial LBAM confirmation, CDFA has conducted ongoing surveys to discover the extent of the infestation. There is insufficient data to definitively date the introduction of the LBAM into California. In 2005, however, LBAM surveys were performed in areas of California where the insect is now prevalent and did not result in any captures (Technical Working Group, 2007). As of March 21, 2008 a total of 18,111 moths have been confirmed as LBAM (CDFA, 2008). Most captures are from traps in southern Santa Cruz and northern Monterey counties (71%) as well as portions of northwest Alameda, western Contra Costa, and northern San Francisco counties (~28%). A very small population is thought to exist as a result of mostly single-trap captures in Los Angeles, Marin, Napa, San Luis Obispo, San Mateo, Santa Clara, and Solano counties (CDFA, 2008).

Management efforts

In 2007, USDA convened the Technical Working Group (TWG) to discuss management and eradication of the LBAM. This group was comprised of several scientists from USDA-APHIS, the University of California at Riverside, Australia Department of Food and Agriculture, and HortResearch Canterbury and Ensis, New Zealand research companies. The TWG recommended that CDFA and APHIS adopt a long-term goal of eradicating LBAM (TWG, 2007; Johnson et al., 2007). The proposed eradication would require the integration of several tactics, which might include mating disruption (pheromone), insecticide treatments (e.g., *Bt*, spinosyns), release of sterile insects, and other techniques (e.g., biological control). Further, the TWG recommended that USDA focus eradication efforts on the most highly infested areas of California, both agricultural and residential.

USDA and CDFA selected mating disruption using synthetic moth pheromones as the primary tool for the current eradication efforts. The pheromones do not cause direct harm to the moths. Instead, they mimic the scent of female moths, thereby confusing male moths and preventing them in most cases from finding and mating with females. The moths live out their natural lives but do not reproduce in significant numbers, leading to the disappearance of the moth over several years.

Mating disruption products may be applied either by ground or by air, depending upon the size and geographic extent of the infestation. The pheromones are less environmentally harmful than highly toxic, broad-spectrum insecticides (e.g., chlorpyrifos) (Johnson et al., 2007; TWG, 2007). Pheromones or other biological control agents generally do not act as quickly as the insecticides they replace (organophosphates, carbamates, pyrethroids). In addition, the efficiency of mating disruption is inversely related to population density (i.e., it works best in sparse infestations) (TWG, 2007).

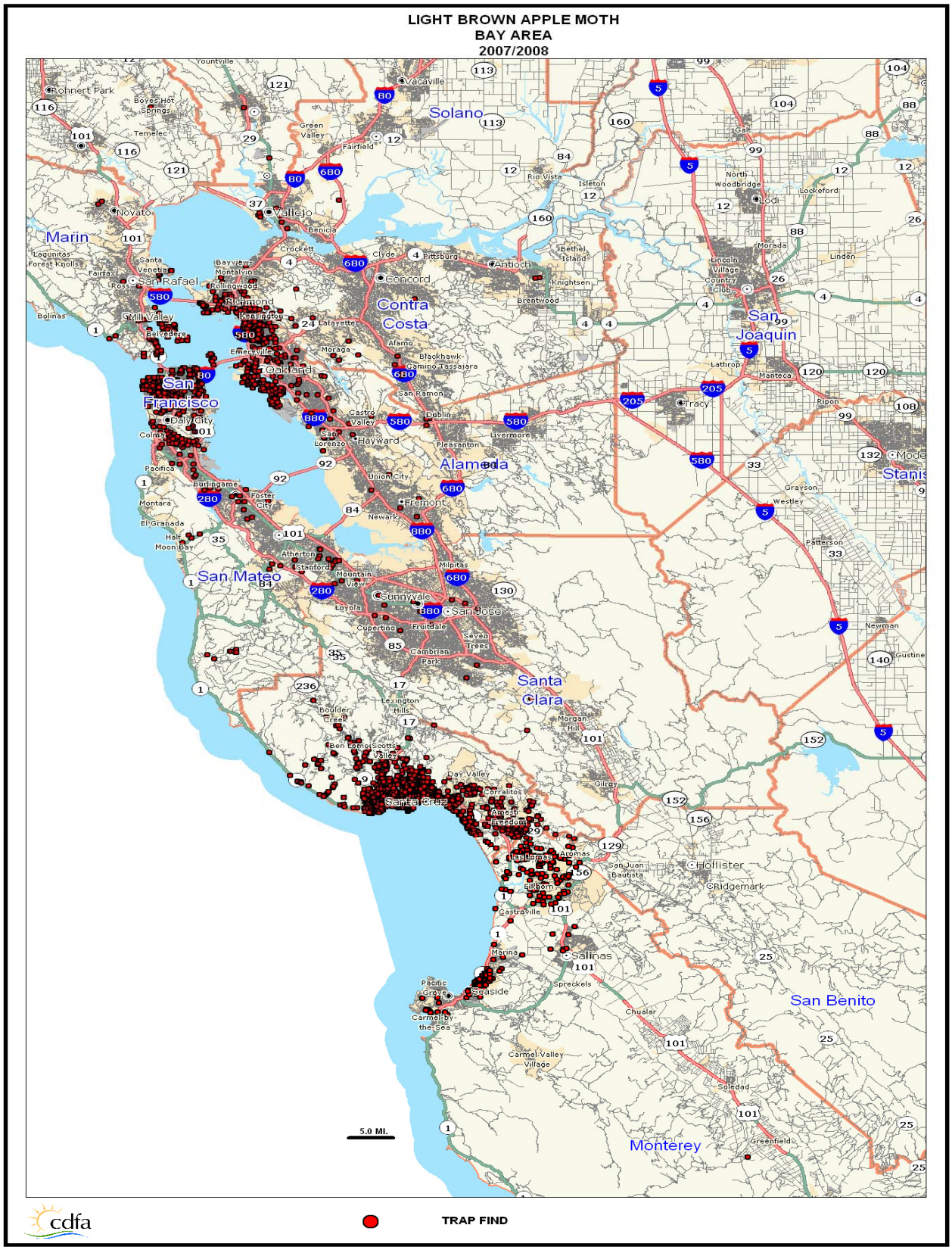


Figure 1. Map of Light Brown Apple Moth Infestations in Northern California

Checkmate® Pheromones

The products CDFA used for LBAM eradication in Monterey and Santa Cruz counties were Checkmate OLR-F®, which contains the pheromones (E)-11-tetradecen-1-yl acetate and (Z)-11-tetradecen-l-yl acetate, and Checkmate LBAM-F®, which contains the pheromones (E)-11-tetradecen-1-yl acetate and (E, E)-9,11-tetradecen-1-yl acetate. The pheromones are the active ingredients (A.I.s) in the pesticide product effective against the targeted pest. These closely related chemicals are produced naturally by lepidopteran species, such as moths and butterflies. Particular pheromone choices and their ratios result in specific mating disruption of the LBAM. Checkmate OLR-F targets the Omnivorous Leaf Roller but also affects the LBAM and was used in the first aerial applications in Monterey. Checkmate LBAM-F more specifically targets the LBAM. It was used in the Santa Cruz County applications and in the November applications in Monterey County.

The individual lepidopteran pheromones are quite similar chemically – so similar that the U. S. Environmental Protection Agency (U.S. EPA) considers them as a group with respect to their toxicity.

C. Toxicology of Checkmate Products

On October 31, 2007, DPR and OEHHA submitted a consensus report to the agency secretaries of the California Environmental Protection Agency, the California Health and Human Services Agency, and the California Department of Food and Agriculture entitled, *"Consensus Statement on Human Health Aspects of the Aerial Application of Microencapsulated Pheromones to Combat the Light Brown Apple Moth."* This document provided toxicity information on the pheromone active ingredients in the products used to combat LBAM. Below are key excerpts from this document:

> "DPR and OEHHA scientists have not reviewed toxicity studies on all the specific active ingredients in LBAM pheromone products; however, they have reviewed acute toxicity studies on other lepidopteran pheromones, and according to the U.S. EPA determination, these studies can be considered to apply to any lepidopteran pheromone. These studies show very low acute oral and dermal toxicity. As an initial screen, toxicologists describe acute toxicity by the LD_{50}, the dose estimated to kill half the test animals. The pheromone studies used extremely high dosages, but did not kill any animals. Consequently, scientists cannot determine the LD_{50}, but can conclude that it is larger than the doses used.
>
> Eye and skin irritation studies indicated the potential for mild to moderate skin and eye irritation (Category III). A study on a chemical similar to one of the active ingredients in the LBAM pheromone does indicate some potential for limited dermal sensitization (Category III), while other studies reviewed by U.S. EPA did not indicate dermal sensitization. However, the maximum application rates for lepidopteran pheromone products range from 15 to 37.5 grams (about 0.5 to 1.3 ounces) of A.I. per acre per application and a total of 150 grams (about 5 ounces) of A.I. per acre per year. These are very low application rates compared with the dose levels used in the above studies. Chronic toxicity is not addressed in

this document because there will not be long-term exposure to the pheromone product.

After reviewing the toxicological data of Short Chain Lepidopteran Pheromones (SCLP), scientists at the U.S. EPA concluded that "*Based on low toxicity in animal testing, and expected low exposures to humans, no risk to human health is expected from the use of these pheromones. During more than 10 years of use of lepidopteran pheromones, no adverse effects have been reported. ... The safety record for lepidopteran pheromones has allowed the Agency to conclude that consumption of food containing residues of the pheromones presents no risk. ... Adverse effects on non target organisms (mammals, birds, and aquatic organisms) are not expected because these pheromones are released in very small amounts to the environment and act on a select group of insects.*" This statement refers primarily to the pheromone active ingredients generally used in emitter devices or aerial application over agricultural areas rather than aerial application over populated areas (such as in the present situation).

Much attention has centered on the identification and potential toxicity of the individual inert ingredients in the Checkmate OLR-F and LBAM-F products. In a recent letter to Assemblymember John Laird from CDFA Secretary A. G. Kawamura, all the ingredients in Checkmate LBAM-F are identified as:

1) Water, the main ingredient.
2) (E)-11 tetradecen-l-yl acetate- the pheromone.
3) (E, E)-9,11 tetradecadien-1-yl acetate- the pheromone.
4) Ammonium phosphate- commonly used in "crystal growing" kits for children and as a plant nutrient.
5) 1,2-benzisothiazol-3-one- used as antibacterial and antifungal agents in a variety of products.
6) 2-hydroxy-4-n-octyloxybenzophenone- used in sunscreen and many products made of plastics, including food containers; useful for its UV-blocking properties.
7) Cross linked polyurea polymer- commonly used in manufacturing of plastics such as polyurethane foam production, waterproofing, insulation, and micro encapsulation agent for pesticides.
8) Butylated hydroxytoluene- common food preservative.
9) Polyvinyl alcohol- polymer commonly used in shampoos and cosmetics, feminine hygiene and incontinence products, children's play putty, glue, lubrication drops for hard contact lens wearers and other products.
10) Tricaprylyl methyl ammonium chloride- commonly used in the manufacture of various pesticides and pharmaceuticals; contributes to product purity.
11) Sodium phosphate- naturally occurring substance. Sodium phosphate is also an additive in egg products and is a prescribed laxative prior to procedures such as colonoscopy.

The percentages of these ingredients are still confidential business information.

> While this information is important, DPR noted that inert ingredients other than water are present in very small amounts and exist primarily as the polyurea shell enclosing the pheromones. These particles consist mostly of pheromones. After application of the particles, the pheromones are slowly emitted over a 30- to 90-day period, and the polyurea shell will biodegrade into urea, a low toxicity compound normally found as a result of the breakdown of proteins in the human body.
>
> Taken together, the toxicity data on the pheromones and on microencapsulated products suggest the possibility that exposure to a sufficient amount of airborne Checkmate microcapsule particles could result in some level of eye, skin, or respiratory irritation. However, as the product is diluted and applied over a large area, the degree of exposure as well as the potential for irritation should decrease significantly."

A DPR study and analysis found that about 3 ounces of the Checkmate formulation were deposited per acre within the aerial-application areas (Schreider and Kim, 2007; Wofford, 2008; Segawa 2008). According to Suterra LLC, the manufacturer of Checkmate, about 72 percent of the formulation consists of water, which indicates that less than one ounce of pheromones and inert ingredients (besides water) were deposited per acre. Consequently, any human exposure to and risk from the pheromone formulation would likely be very low. However, as symptoms were reported following the spraying, we have carefully reviewed the reports that we received.

The Organization for Economic Cooperation and Development (OECD) also published a review of the use of pheromones as an alternative to pesticides. OECD is an intergovernmental organization comprised of 30 countries in North America, Europe and the Pacific. They work to coordinate and harmonize government policies, address issues of mutual concern and respond to international problems. In 1992, they created a pesticide program whose tasks included harmonizing pesticide review procedures, evaluating pesticides and reducing risks associated with pesticides. They considered pheromone formulations as reduced-risk compounds that could be used as tools for programs in Integrated Pest Management. Their statements were consistent with U.S. EPA's report that the pheromones "act by modifying the behavior of the pest rather than killing it, are more target specific than conventional insecticides, are used in concentrations close to those in nature and dissipate rapidly" (OECD, 2001).

D. Procedures for Collecting Symptom Reports (Methods)

Data Sources:

For the 2007 aerial applications, CDFA set up a call center for citizens to report their symptom complaints and concerns. The CDFA call center staff filled out a Citizen Illness Report (CIR) form and these reports were forwarded to OEHHA and DPR. Occasionally, some symptom reports were sent directly to OEHHA and DPR in the form of letters. The Monterey County Department of Health, Division of Environmental Health, also received reports via telephone that were forwarded to OEHHA and DPR. Additionally, and in accordance with state law, the County Health Officer of Santa Cruz

County received Pesticide Illness Reports (PIRs) from physicians who saw patients with symptoms during the period of the aerial spraying and forwarded those reports to DPR and OEHHA. Prompted by public concern about the aerial spraying, several citizen groups collected information on health complaints that occurred around the time of the spraying via online accounts such as www.craigslist.org, reactiontospraying@yahoo.com, www.stopthespray.org. Some individuals also sent e-mails to the Santa Cruz Sentinel to register their concerns and symptom reports. In preparing this report, information from all of these sources was incorporated into a secure, confidential database using Microsoft Access. Data analyses are described in the summary of findings section of this report.

Limitations:
Because of the non-standardized collection of symptom reports through the various sources, most of the data collected lacked information necessary to provide a complete evaluation of all the reports. However, each report was considered and counted as a symptom report regardless of its completeness. Each individual, in each reported incident, is counted as a symptom report. Although this practice goes against standard epidemiological methods, it ensured that all reports were evaluated and analyzed. Furthermore, it verifies the need for a surveillance system to track the symptom reports using standard data collection tools for future pest eradication projects.

Categorization of Symptoms:
OEHHA's PIR form is used by physicians and local health departments to report pesticide-related illnesses and injuries to the state as required under the California Health and Safety Code Section 105200. The categories of symptoms listed on the PIR form (Appendix A) were used as the template for recording the symptoms reported by citizens to other locations after the aerial pheromone spraying.

The PIR includes a list of common signs and symptoms of exposure to a wide variety of pesticides; it also provides space in which users can write in other symptoms not listed. Symptoms were categorized under the following headings:

> ***Dermatologic****:* blistering, burns, edema, erythema (redness), pain/irritation, pruritus (itching), rash.
> ***Ocular****:* blurred vision, corneal abrasion, irritation/pain, lacrimation (tearing), miosis (pinpoint pupils), photophobia (light sensitivity).
> ***Respiratory****:* cough, dyspnea (shortness of breath), rhinitis (runny nose), upper respiratory irritation/pain, wheezing.
> ***Gastrointestinal****:* abdominal pain/cramping, diarrhea, nausea, vomiting.
> ***Neurologic/Sensory****:* anxiety/irritability, ataxia (incoordination), confusion, depressed consciousness/coma, diaphoresis (profuse sweating), dizziness, fasciculation (muscle twitching), headache, muscle pain/cramping, muscle weakness, numbness/tingling, salivation, seizure, tremors.
> ***Other systemic****:* chest pain, excessive urination, fatigue, fever/hyperexia (delirium), malaise (general unwell feeling), tachycardia (rapid heart rate).

Maintaining patient and individual record confidentiality:
Handling of all received symptom reports complied with state and federal requirements for maintaining confidential medical and private information.

E. Summary of Findings

We compiled a total of 643 symptom reports from all the various sources. We determined that 180 reports were either duplicates (in which individuals reported the same symptoms to two or more sources) or were reports of something other than symptoms in humans (such as environmental or property damage). After eliminating these reports, we analyzed a total of 463 reports of human symptoms. Of the 463 reports, 266 (57.5%) were from Monterey County, 167 (36%) were from Santa Cruz County and 9 (2%) were from Santa Clara County, which is just to the north of Santa Cruz County. The county was not identified in 21 (4.5%) reports. The sources of the symptom reports are presented in Figure 2. In addition, Table 1 (found in Appendix A) contains the summarized data and shows the number of individuals who reported to more than one source.

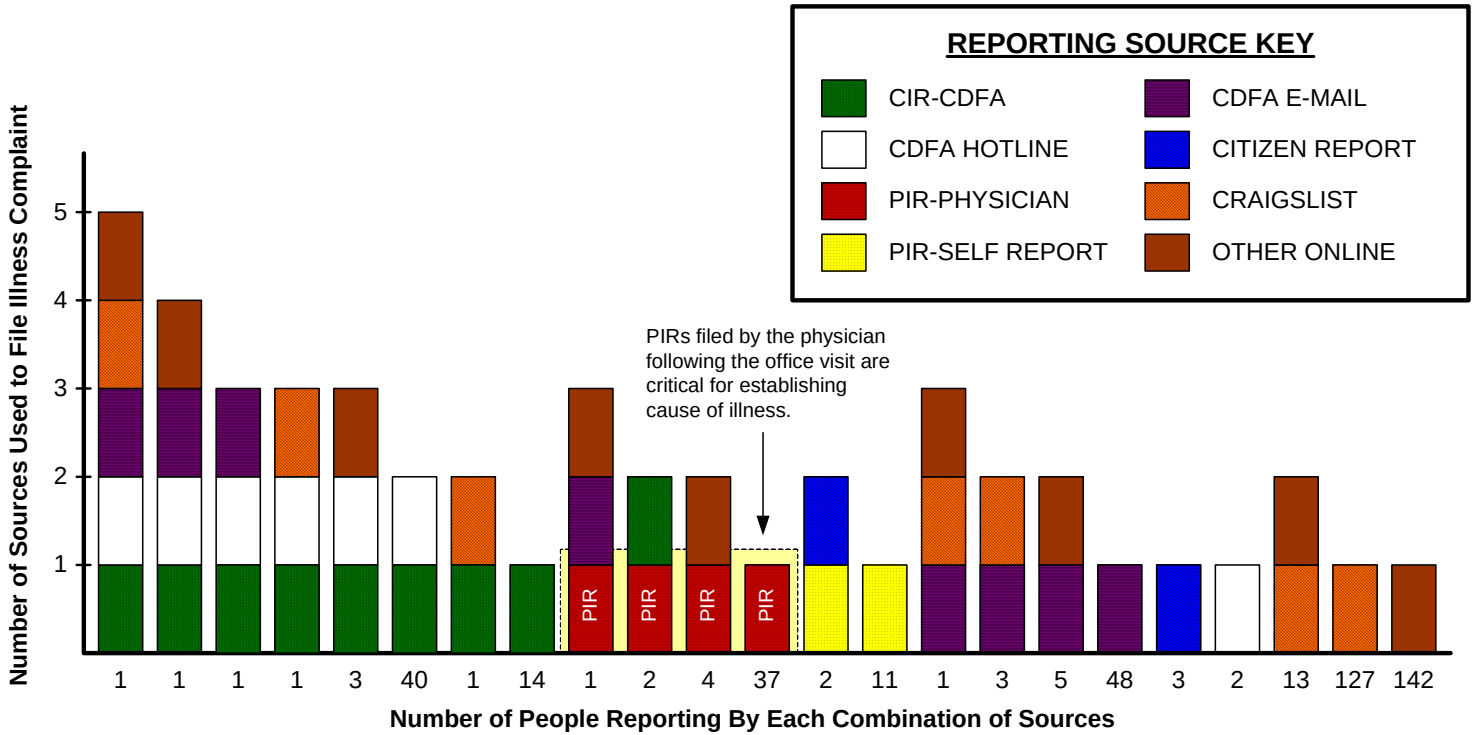
Figure 3 presents the report sources by county. The data for reporting sources can be found in Table 2 (Appendix A). Individuals who reported to multiple sources were counted as one report and categorized according to which report was first received by OEHHA and DPR.

Figure 4 presents the symptoms reported on each of the reports. Symptoms were grouped into categories used on the PIR form (see Appendix A) as explained previously. Figure 4 also includes combinations of categories to represent the experience of people who reported several types of symptoms. Data for Figure 4 are summarized in Table 3, Appendix A.

A total of 321 individuals (70%) reported respiratory symptoms, including 101 (31.5%) who reported respiratory symptoms exclusively, and 202 (63%) who reported upper respiratory irritation symptoms as well as other systemic or dermal and/or ocular symptoms.

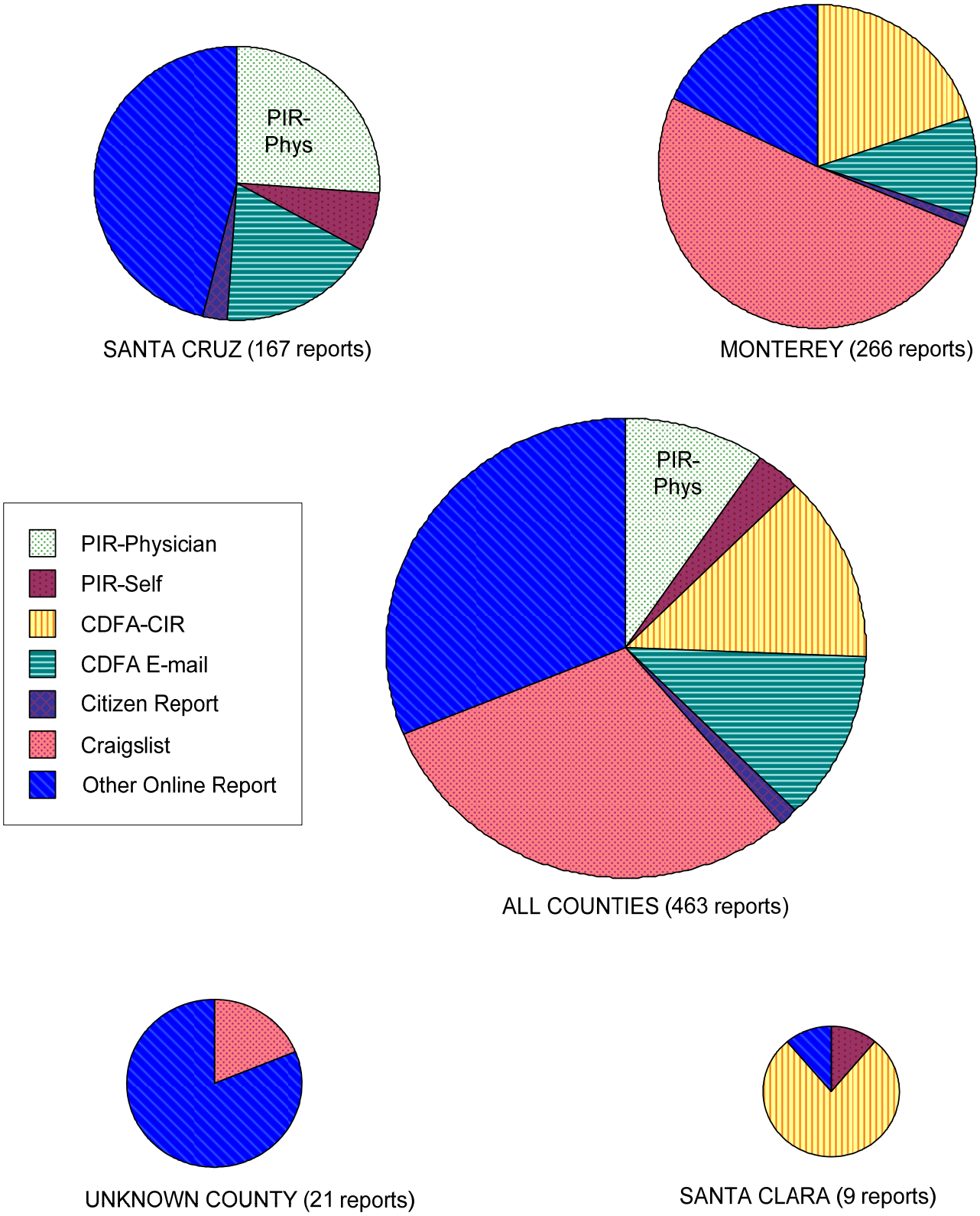
Figure 5 summarizes the number of individuals who reported that they sought medical attention. Of the 463 cases, 74 (16%) sought medical attention. Among those, 24 (32%) were from Monterey County, 44 (59%) from Santa Cruz County and 6 (8%) from Santa Clara County. All 44 PIRs were submitted by physicians from Santa Cruz County. There were no physician-reported illnesses from either Monterey or Santa Clara County.

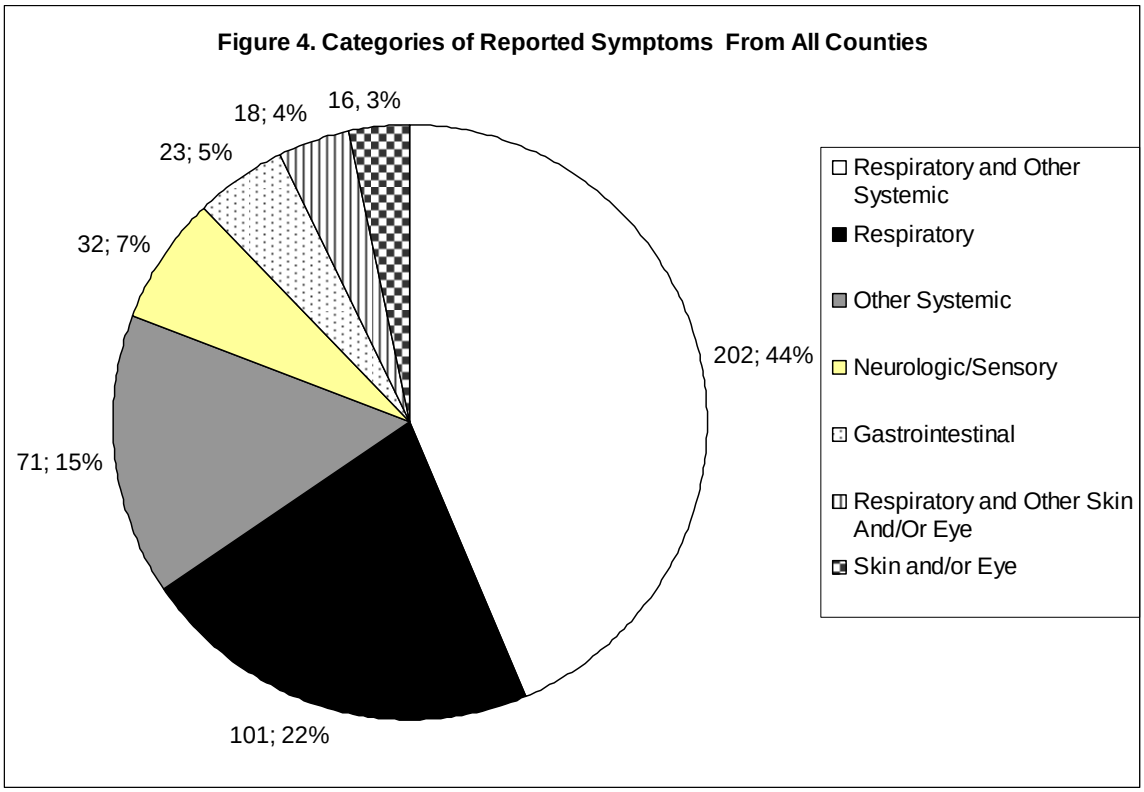
FIGURE 2. SOURCES OF SYMPTOM COMPLAINTS AFTER AERIAL PHEROMONE SPRAYING IN MONTEREY AND SANTA CRUZ COUNTIES IN FALL 2007



PIR-PHYSICIAN: Pesticide Illness Report [Form OEH 700 (9/2006)] completed by a physician.
PIR-SELF REPORT: PIR [Form OEH 700 (9/2006)] completed by a person that did not consult a physician.
CIR-CDFA: Citizen illness report received from persons that called the California Department of Food and Agriculture (CDFA) call center to report health effects of the spraying.
CITIZEN REPORT: Letters sent by individuals directly to OEHHA, CDFA and DPR.
CDFA HOTLINE: Phone number individuals called to complain to CDFA about the spraying, but not specifically for health-related complaints.
CDFA E-MAIL: Reports received from individuals who sent an e-mail to the CDFA Office of Public Affairs.
CRAIGSLIST: Website where individuals posted their health-related complaints in relation to the LBAM spraying in Monterey County.
OTHER ONLINE: Other online sources included reactiontospraying@yahoo.com, www.stopthespray.org, and the Santa Cruz Sentinel website.

Figure 3. REPORTING SOURCES BY COUNTY





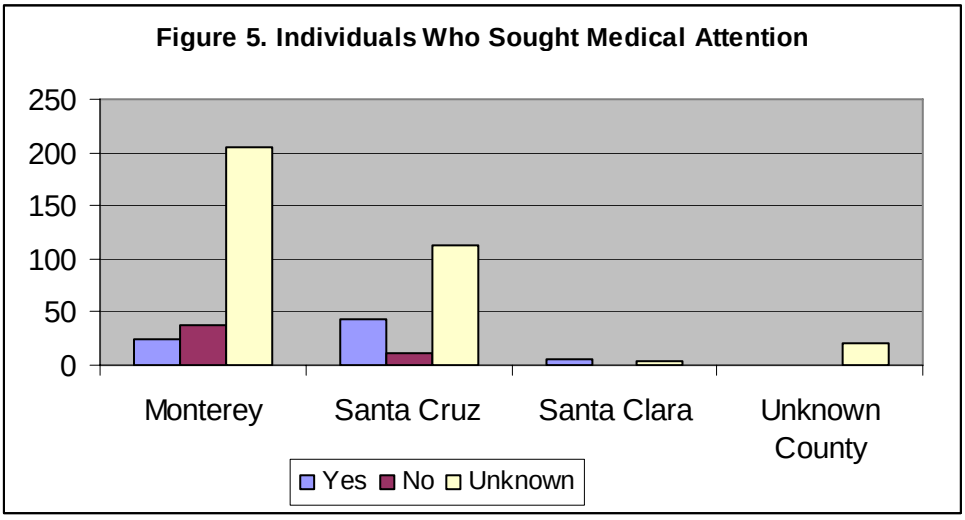
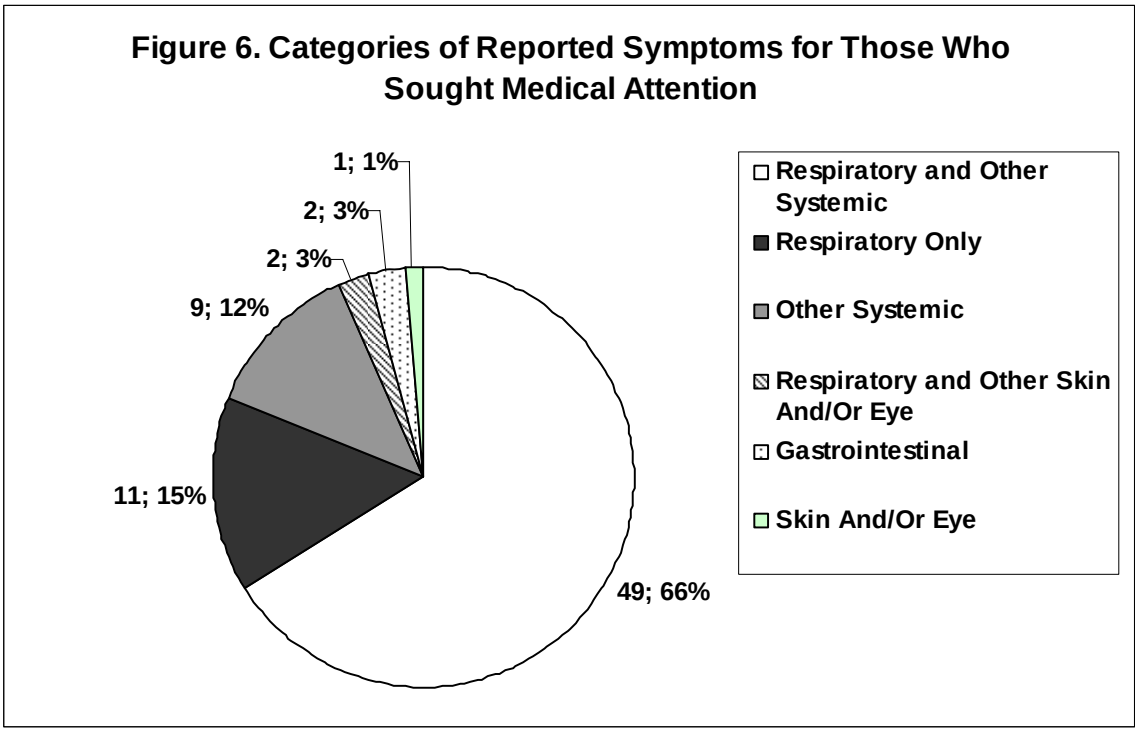


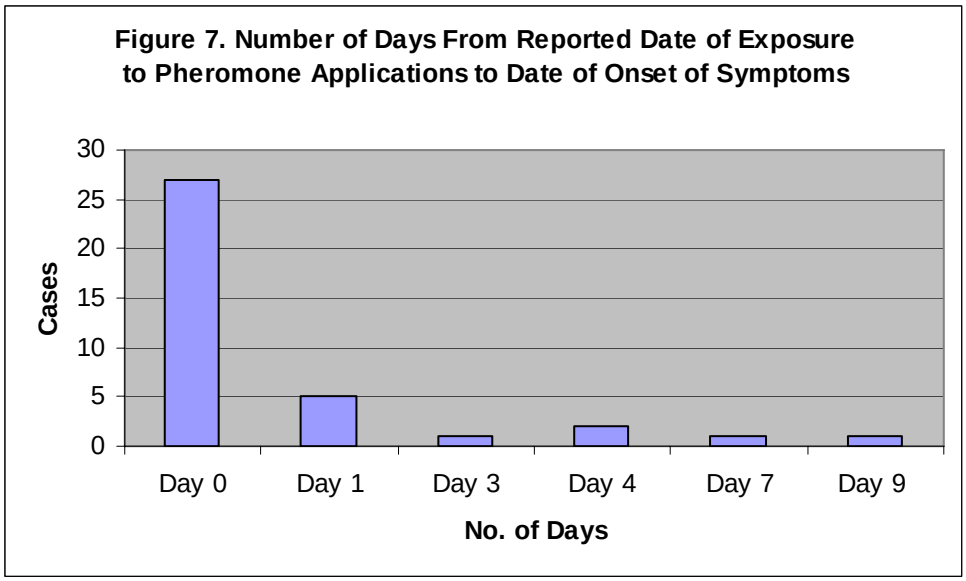
Figure 6 summarizes the symptoms experienced by the 74 individuals who sought medical attention. The information was abstracted from the PIR forms or from the CIR as reported by the individuals. Data for Figure 6 is in Table 5, Appendix A.



Eleven of the 74 individuals seeking medical attention (15%) reported respiratory irritation symptoms exclusively while 51 (66%) individuals reported other symptoms in addition to respiratory irritation symptoms.

Among the 74 reports of individuals who sought medical attention, we received 44 PIRs from 28 medical providers. Those reports were evaluated to categorize the respiratory symptoms further. Of the 44 reports, 13 reports pertained to ten individuals with prior diagnoses of asthma, including one who was said to have been asymptomatic for the previous two years and another identified as having had childhood asthma. Seven of the ten individuals received diagnoses of asthma exacerbation, and another of reactive airway disease. Two of the ten individuals sought medical attention more than once. Each report was recorded separately, because they reported distinct exposure and symptom onset dates. Three additional physician reports pertained to people with no prior asthma diagnosis but who presented with wheezing.

Of the 44 PIRs, 37 had complete information on dates of exposure, symptom onset, and medical evaluation. Figure 7 shows that 27 individuals (73%) stated they developed symptoms on the same day as the exposure date while five individuals developed symptoms within a day of the exposure date. Another five individuals developed symptoms between 3 to 9 days after the exposure dates.



Additionally, among the 37 individuals, 14 individuals (38%) sought medical care within 2 days of date of exposure, 10 individuals (27%) sought care within 7 days, 11 individuals within 8 to 21 days, one after 43 days and another one within 96 days after exposure. Figure 8 shows the distribution of individuals and the number of days that elapsed before they sought medical attention.

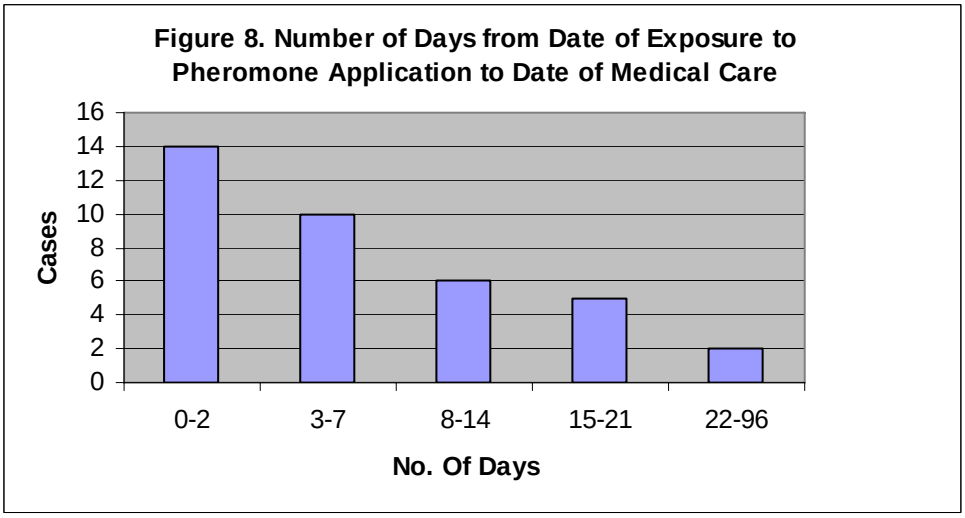
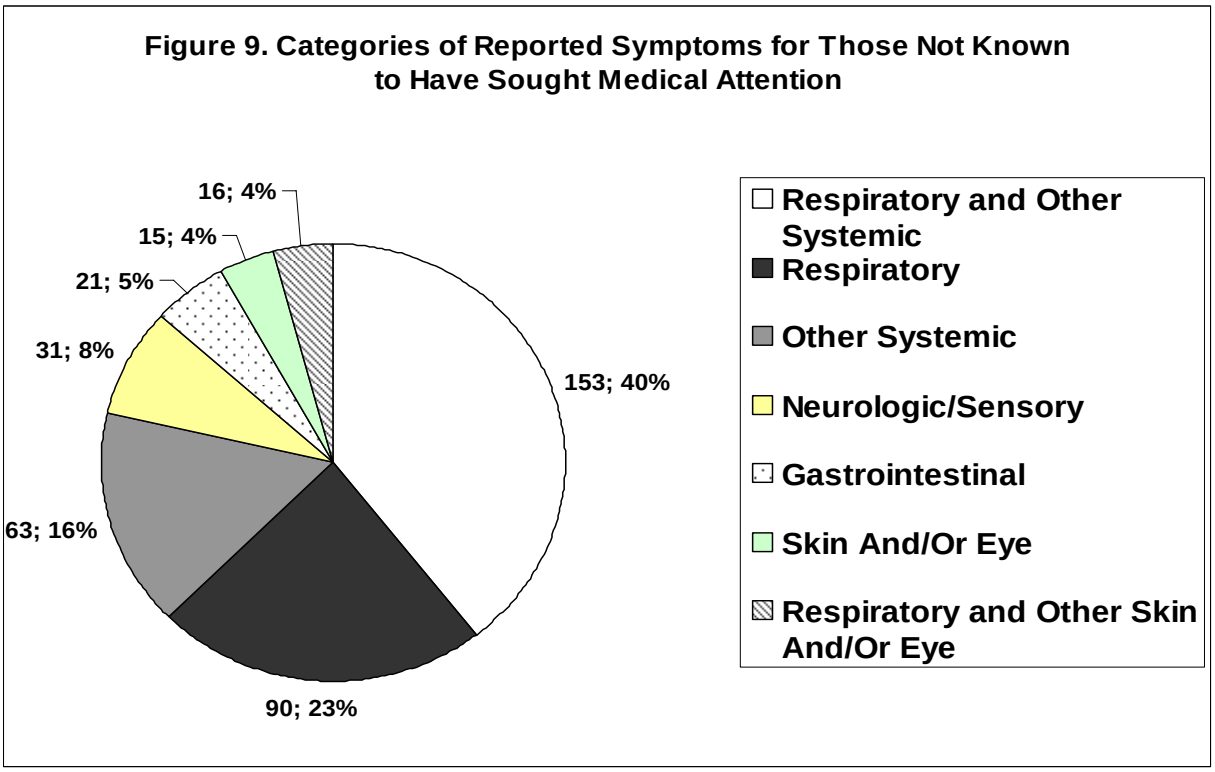


Figure 9 summarizes the symptom distribution for those 389 individuals not known to have sought medical attention. Respiratory symptoms were only slightly less prominent than among people who consulted doctors, being reported by 259 (66.5%) of the 389 individuals, including 169 who reported additional symptoms. The other 130 people reported symptoms including eye and skin irritation, gastrointestinal symptoms and other systemic symptoms.



The populations within the application areas of Monterey-Seaside (107,777), Santa Cruz (123,725), Salinas (42,238) and Prunedale (11,065) were estimated using 2000 census data (US Census, 2000). In this instance, the total population for all the application sites is approximately 392,582, with Monterey being counted twice since aerial applications occurred there twice. The reporting rate for symptoms obtained around the time of the aerial spraying is 1.2 illnesses per 1000 individuals (number of reported illnesses/population in all application sites). This corresponds to a 0.001 symptom reporting rate.

F. Discussion

The Fall 2007 pheromone applications to begin eradication of the LBAM generated intense public controversy. The residents of communities where the applications occurred expressed concern over the possible short- and long-term health effects of the pheromone applications. Several hundred people contacted Web sites, online newspapers, the CDFA hotline and various agencies to file complaints and report symptoms that they had attributed to the spraying. These reports were collected, and available symptom information was entered into a database and analyzed by OEHHA, DPR and CDPH.

In this report, respiratory symptoms (such as cough, shortness of breath, runny nose, upper respiratory irritation/pain, and wheezing) were prominent, reported by 321 (70%) of the 463 individuals who reported symptoms. Among those who sought medical

attention, 62 of 74 (84%) reported respiratory symptoms. PIRs indicated seven diagnoses of asthma exacerbation, two of asthma, and one of reactive airway disease. The remaining PIRs indicated many of the general respiratory symptoms cited above, along with headaches and diarrhea.

It is not possible for several reasons to conclusively determine whether or not there is a link between the reported symptoms and the aerial spraying. First, no medical tests are available to diagnose or confirm that an illness resulted from exposure to the pheromone formulations of Checkmate OLR-F and LBAM-F. The known toxicology of these products suggests that if they caused symptoms, the symptoms would be non-specific, such as coughing and sneezing, which could easily be caused by many conditions including the common cold and allergies.

Second, less than one quarter of the reports identified either the date or the location of exposure. Even fewer provided the time course of symptom development. For self-reporting cases, very few citizens provided addresses for correlation to the spray area. This information is critical to ascertaining whether reported symptoms might plausibly have been caused by exposure to the Checkmate compounds.

Third, a professional medical assessment of one's symptoms with a complete medical history can help strengthen the evidence for an exposure-symptom relationship. Reports of medical providers, which provide valuable corroborating evidence, (i.e., date of onset of illness, date of exposure, location where exposure occurred, description of exposure circumstances, individual's activity during exposure), were submitted for fewer than 10% of the reports. While 74 individuals reported that they consulted a physician, only 44 illness reports were submitted by physicians.

Fourth, any likely human exposures to the Checkmate compounds would be very low, based on DPR estimates (Schreider and Kim, 2007) and monitoring data obtained during the aerial applications (Wofford, 2008).

Fifth and finally, the reported symptoms are non-specific in nature and, as explained below, are quite common among the general population. The Behavioral Risk Factor Surveillance System Survey (BRFSS) sponsored by the U.S. Centers for Disease Control and Prevention and administered by CDPH is used to evaluate behaviors associated with preventable chronic diseases, injuries and infectious diseases. In 1991, CDPH staff added general symptom questions to the telephone based survey that used random-digit dialing to sample about 3,000 Californians from all over the state. One series of added questions was, "In the last seven days, have you had a headache, eye irritation, nausea, wheezing?" The responses indicated that at any given time within a seven-day period, an average of about 150 to 250 per 1000 adult Californians experience irritated eyes, wheezing or headache without attributing it to any specific cause. This would correspond to a 0.15 to 0.25 symptom reporting rate, or 15% to 25% (BRFSS, 1991). Given the range of causes for these symptoms and the large number of individuals expected to experience such symptoms at any given time, the symptoms in the 463 reports make it difficult to clearly attribute these symptoms to any specific cause. Since the LBAM

illness data was obtained passively through complaints submitted by affected individuals, the symptom reporting rates cannot be directly compared to the results of the BRFSS.

G. Conclusion

More than 90 percent of the 463 symptom reports do not contain adequate information for us to determine whether or not there is a link between the reported symptoms and the Checkmate applications. In order to look for a relationship between reported symptoms and exposure to the pheromone spray, we need specific data, such as when and where the exposure occurred, how soon after exposure the person reported symptoms, when the person visited the doctor, and the list of symptoms. In addition, the fact that there is no diagnostic test to confirm pheromone exposure, the high background symptom reporting rate and the very low pheromone application rates make it very difficult to determine with any degree of certainty if the symptoms were caused by the pheromone formulation.

Despite the many limitations mentioned, our data suggest that the reported symptom rates are low and involve reported symptoms that are relatively mild or common among the unexposed general public. The collected data are useful in planning future surveillance programs aimed at protecting the public's health. OEHHA, DPR, and CDPH are currently designing a program for collecting symptom and illness reports related to future LBAM eradication efforts. In order to improve the quality of information obtained, the program will encourage people to call a single location or visit their doctors if they think they have been exposed to and are ill from any LBAM eradication products. Training will be offered to physicians on how to recognize and report known or suspected pesticide-related illness. By collecting complete and timely reports in a standardized manner we can detect events that need more careful follow-up to determine if there are any unexpected, severe health events from LBAM eradication efforts.

H. Recommendations

Prior to any future aerial applications of pheromone pesticides intended to eradicate the LBAM, we recommend the following steps be taken:

1. Have clear communications to local government officials and the public on the importance and effectiveness of the eradication efforts, available information on any potential health risks associated with the pheromone formulation to be used, and steps that individuals can take to minimize their potential exposure to the formulation.

2. Provide information and recommendations for people who are worried about their respiratory health or consider themselves chemically sensitive, and who may want to make a special effort to avoid exposure to the formulation.

3. Coordinate effectively with local health agencies, other state agencies and elected officials on collecting and evaluating illness reports.

4. Enhance existing reporting systems by establishing a centralized system for collecting and analyzing citizen symptom and illness reports and an effective data-sharing system among health and regulatory agencies.

5. Communicate effectively with community health care providers on the recognition of pesticide-related illnesses and symptoms and the mechanisms for reporting pesticide illnesses.

OEHHA, DPR and CDPH are currently preparing to implement these recommendations in conjunction with CDFA's planned 2008 LBAM aerial applications in Monterey and Santa Cruz counties and the San Francisco Bay Area in the summer of 2008.

Addendum

On April 1, 2008, OEHHA, DPR and CDPH received an additional 29 symptom reports and two non-symptom reports via e-mail. Those cases were also entered into the confidential database and evaluated.

Among the 29 reports, five have already been reported previously; thus, 24 new symptom reports were received. One PIR was received while 23 were received from either e-mails to an individual, or reports to Web sites (www.stopthespray.org and reactiontospraying@yahoo.com). Four of the 23 reports originated from Monterey County, 14 reports originated from Santa Cruz County, and no county was identified in five reports. The one PIR came from Santa Cruz County.

Upon evaluation of the reports, we found that an additional four individuals sought medical attention, although we did not receive PIRs for them. Respiratory symptoms, in addition to other systemic, eye and skin effects, were recorded from the one PIR while 18 of the 23 other reports (79%) also noted respiratory symptoms. Although other systemic, eye and skin symptoms were also noted, the evaluations reflect the symptoms also recorded in previous report.

Consequently, 487 reports were received from all sources as of April 1, 2008. Of those, 45 were reported by physicians as PIRs, while 442 were received from other sources. These new symptom reports do not significantly alter the statistical information, discussion or conclusions presented in this document.

References

Animal and Plant Health Inspection Service (APHIS) (2007a). General website for light brown apple moth information. http://www.aphis.usda.gov/plant_health/plant_pest_info/lba_moth/index.shtml

APHIS (2007b). Federal domestic quarantine order. *Epiphyas postvittana* (Light Brown Apple Moth) (LBAM). DA-2007-42.

APHIS (2007c) Federal domestic quarantine order. *Epiphyas postvittana* (Light Brown Apple Moth) DA-2007-42 http://www.aphis.usda.gov/plant_health/plant_pest_info/lba_moth/downloads/federalorder-11-20-07.pdf

California Department of Public Health (1991). Behavioral Risk Factor Surveillance System Survey (BRFSS) for California, 1991. http://www.cdc.gov/brfss/.

California Department of Food and Agriculture (CDFA) (2007). Light Brown Apple Moth Project. Website: http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html

CDFA (2008). APHIS – Plant Protection and Quarantine and California Department of Food and Agriculture. Daily Situation Report: Light Brown Apple Moth (LBAM),, March 21, 2008. Available online at: http://www.cdfa.ca.gov/phpps/pdep/lbam/pdfs/SituationReports/Feb08/LBAM_Weekly_Situation_Report_March 21_2008.pdf

Johnson MW, Pickel C, Strand LL et al. (2007). Light brown apple moth in California: Quarantine, management, and potential impacts. University of California Agriculture and Natural Resources, UC Statewide Integrated Pest Management Program. July 17, 2007. Available online at: http://www.ipm.ucdavis.edu/EXOTIC/lightbrownapplemoth.html. or http://www.aphis.usda.gov/plant_health/plant_pest_info/lba_moth/downloads/LBAM_IPM_UCDavis.pdf

OECD (2001). Guidance for Registration Requirements for Pheromones and other Semiochemicals Used for Arthropod Pest Control. Environment, Health and Safety Publications, Series on Pesticides No. 12.

Schreider, J, Kim, D.(2007). Environmental Monitoring Recommendation for Synthetic Pheromone Treatments to Eradicate the Light Brown Apple Moth. Memorandum to Randy Segawa, Department of Pesticide Regulation dated August 27.

Segawa, Randy (2008). Personal Communication. April 2.

TWG (2007). Recommendations of the Technical Working Group for the Light Brown Apple Moth Infestation in California. 8 June 2007. These recommendations were developed during a meeting of the Technical Working Group in San Jose, California,

May 16-18.
http://www.aphis.usda.gov/plant_health/plant_pest_info/lba_moth/downloads/twg-recommendations.pdf

US Census Bureau. US Census 2000. http://www.census.gov/main/www/cen2000.html.

Wofford, P. (2008). Personal Communication. January 7.

APPENDIX A

Table 1. Sources of Symptom Reports

Combinations of Reporting Sources [a] Identified Among Collected Reports		Number of Distinct Individuals	Number of Reports Filed	Total Reports	Total Individuals
Pesticide Illness Report (PIR) Physician Reports [b]					
	PIR, CDFA Citizen Illness Report	2	4		
	PIR, CDFA e-mail, other online reports	1	3		
	PIR, other online reports	4	8		
	PIR only	37	37	52	44
Pesticide Illness Report (PIR) self-report [c]					
	PIR self-report, Citizen's Report	2	4		
	PIR self-report	11	11	15	13
Citizen Illness Report (CIR) CDFA [d]					
	CIR, CDFA hotline, CDFA e-mail, Craigslist, other online reports	1	5		
	CIR, CDFA hotline, CDFA e-mail, other online reports	1	4		
	CIR, CDFA hotline, CDFA e-mail	1	3		
	CIR, CDFA hotline, Craigslist	1	3		
	CIR, CDFA hotline, other online reports	3	9		
	CIR, CDFA hotline	40	80		
	CIR, Craigslist	1	2		
	CIR	14	14	120	62
Citizen Report [e]		3	3	3	3
CDFA hotline [f]		2	2	2	2
CDFA e-mail [g]					
	CDFA e-mail, Craigslist, other online reports	1	3		
	CDFA e-mail, Craigslist	3	6		
	CDFA e-mail, other online reports	5	10		
	CDFA e-mail	48	48	67	57
Craigslist [h]					
	Craigslist, other online reports	13	26		

Combinations of Reporting Sources [a] Identified Among Collected Reports		Number of Distinct Individuals	Number of Reports Filed	Total Reports	Total Individuals
	Craigslist	127	127	153	140
Other online Reports [i]		142	142	142	142
TOTAL			**554**	**554**	**463**

[a] This table identifies sources from which reports were received in and the numbers of individuals who reported to each. Those individuals were counted and categorized according to where they reported their symptoms.
[b] Pesticide illness reports (PIR) are required to be completed by physicians according to the Health and Safety Code 105200 for events evaluated by physicians as likely to relate to pesticide exposure.
[c] PIR self report are reports sent by individuals who used a PIR form to record their symptoms without consulting a physician.
[d] CDFA citizen illness reports were received from individuals who called the CDFA call center to report symptoms of the spraying.
[e] Citizens reports were letters sent directly to OEHHA, CDFA and DPR.
[f] CDFA hotline was the number where individuals called to complain, not necessarily for health-related calls.
[g] CDFA e-mails were reports received from individuals who sent an e-mail to the CDFA Office of Public Affairs
[h] Craigslist.org is a website where individuals posted their health related reports in relation to the LBAM spraying in Monterey County
[i] Other online reports include reactiontospraying@yahoo.com, www.stopthespray.org and the Santa Cruz Sentinel website www.santacruzsentinel.com .

Table 2. Sources of Symptom Reports by County

Reporting Source	Monterey County		Santa Cruz County		Santa Clara County		Unknown		Total	
	No.	% of total	No.	% of total	No.	% of total	No.	% of total	No.	% of total
Pesticide Illness Report (physicians) [a]	0	0.0	44	26.0	0	0.0	0	0.0	44	9.5
Pesticide Illness Report (self-report) [b]	0	0.0	12	7.0	1	11.0	0	0.0	13	3.0
CDFA Citizen Illness Reports [c]	53	20.0	0	0.0	7	78.0	0	0.0	60	13.0
CDFA e-mails [d]	27	10.0	30	18.0	0	0.0	0	0.0	57	12.0
Citizens Report [e]	2	1.0	5	3.0	0	0.0	0	0.0	7	1.5
Craigslist [f]	136	51.0	0	0.0	0	0.0	4	19.0	140	30.0
Other online reports [g]	48	18.0	76	46.0	1	11.0	17	81.0	142	31.0
Total	**266**	**100.0**	**167**	**100.0**	**9**	**100.0**	**21**	**100.0**	**463**	**100.0**

[a] Pesticide illness reports (PIR) are submitted by physicians as required by the Health and Safety Code 105200

[b] PIR self report are reports sent by individuals who used a PIR form to record their symptoms without consulting a physician.

[c] CDFA citizen illness reports were received from individuals who called the CDFA call center to report symptoms of the spraying.

[d] CDFA e-mails were reports received from individuals who sent an e-mail to the CDFA Office of Public Affairs

[e] Citizens reports were letters sent directly to OEHHA, CDFA and DPR.

[f] Craigslist.org is a website where individuals posted their health related reports in relation to the LBAM spraying in Monterey County

[g] Other online reports include reactiontospraying@yahoo.com, www.stopthespray.org and the Santa Cruz Sentinel website www.santacruzsentinel.com

Table 3. Reported Symptoms Distribution

Symptoms [a]	Monterey		SantaCruz		Santa Clara		Unknown		Total	
	No.	% total	No.	% total	No.	% total	No.	% total	No.	% total
Dermatologic/ Ocular	8	4.0	8	5.0	0	0.0	0	0.0	16	3.0
Gastrointestinal	17	6.0	6	3.0	0	0.0	0	0.0	23	5.0
Neurologic/ Sensory	17	6.0	13	8.0	1	11.0	1	5.0	32	7.0
Respiratory	70	26.0	23	14.0	0	0.0	8	38.0	101	22.0
Respiratory and other Dermatologic or Ocular	11	4.0	6	3.0	0	0.0	1	5.0	18	4.0
Respiratory and Other Systemic	114	43.0	73	44.0	7	78.0	8	38.0	202	44.0
Other Systemic	29	11.0	38	23.0	1	11.0	3	14.0	71	15.0
Total	**266**	**100.0**	**167**	**100.0**	**9**	**100.0**	**21**	**100.0**	**463**	**100.0**

[a] List of symptoms and their categories are listed in the PIR form in Appendix A.

Table 4. Number of Individuals Who Sought Medical Attention

Physician	Monterey		Santa Cruz		Santa Clara		Unknown		Total	
	No.	% total	No.	% total	No.	% total	No.	% total	No.	% total
Yes	24	9	44	26.0	6	67.0	0	0.0	74	16.0
No	37	14	11	7.0	0	0.0	0	0.0	48	10.0
Not Reported	205	77	112	67.0	3	33.0	21	100.0	341	74.0
Total	**266**	**100.0**	**167**	**100.0**	**9**	**100.0**	**21**	**100.0**	**463**	**100.0**

Table 5. Reported Symptoms Distribution for Those Who Sought Medical Attention

Symptoms [a]	Monterey		SantaCruz		Santa Clara		Total	
	No.	% total	No.	% total	No.	% total	No.	% total
Dermatologic/ Ocular Only	1	4.0	0	0.0	0	0.0	1	1.0
Gastrointestinal	1	4.0	1	2.0	0	0.0	2	3.0
Respiratory Only	6	25.0	5	11.0	0	0.0	11	15.0
Respiratory and other Dermatologic or Ocular	1	4.0	1	2.0	0	0.0	2	3.0
Respiratory and Other Systemic	15	63.0	29	66.0	5	83.0	49	66.0
Other Systemic	0	0	8	18.0	1	17.0	9	12.0
Total	**24**	**100.0**	**44**	**100.0**	**6**	**100.0**	**74**	**100.0**

Table 6. Symptom Distribution for Those Not Known To Have Sought Medical Care

Symptoms [a]	Monterey		Santa Cruz		Santa Clara		Unknown		Total	
	No.	% total	No.	% total	No.	% total	No.	% total	No.	% total
Dermatologic/ Ocular	7	3.0	8	6.0	0	0.0	0	0.0	15	4.0
Gastrointestinal	16	7.0	5	4.0	0	0.0	0	0.0	21	5.0
Neurologic/ Sensory	17	7.0	12	10.0	1	33.0	1	5.0	31	8.0
Respiratory	64	26.0	18	15.0	0	0.0	8	38.0	90	23.0
Respiratory and other Dermatologic or Ocular	10	4.0	5	4.0	0	0.0	1	5.0	16	4.0
Respiratory and Other Systemic	99	41.0	44	36.0	2	67.0	8	38.0	153	39.0
Other Systemic	29	12.0	31	25.0	0	0.0	3	14.0	63	16.0
Total	**242**	**100.0**	**123**	**100.0**	**3**	**100.0**	**21**	**100.0**	**389**	**100.0**

CONFIDENTIAL REPORT OF KNOWN OR SUSPECTED PESTICIDE-RELATED ILLNESS

Please provide as much information as possible. Fields marked with an asterisk* are critical for follow-up investigations.

Patient's Last Name*

Social Security Number

Birth Date* Month Day Year

First Name*

Middle Name (or Initial)

Age

Units

Address: Number, Street*

Apt/Unit Number

City/Town*

State*

ZIP Code*

County*

Home Telephone* ( )

Cellular Telephone* ( )

Gender* ☐ Male ☐ Female ☐ Unknown

Work Telephone ( )

Occupation

Ethnicity* (check one)
- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino
- ☐ Unknown

Race* (check one or more)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Asian Indian
- ☐ Black or African American
- ☐ Filipino
- ☐ Guamanian
- ☐ Native Hawaiian
- ☐ Other Pacific Islander
- ☐ Samoan
- ☐ White
- ☐ Other Race:_____
- ☐ Unknown

Reporting Provider - Last Name*

First Name*

Telephone Number* ( )

Reporting Health Care Facility*

FAX Number ( )

Address: Number, Street

Suite Number

Submitted by*

City

State

ZIP Code

Date Submitted* Month Day Year

Illness Onset Date Month Day Year

Initial Examination Date* Month Day Year

List Any Pre-existing Conditions, If Known (e.g., allergies, asthma, pregnancy, etc)

Signs and Symptoms* (check all that apply)

Dermatologic
- ☐ Blistering
- ☐ Burns
- ☐ Edema
- ☐ Erythema (redness)
- ☐ Irritation/Pain
- ☐ Pruritis (itching)
- ☐ Rash
- ☐ Other_____

Gastrointestinal
- ☐ Abdominal pain/cramping
- ☐ Diarrhea
- ☐ Nausea
- ☐ Vomiting
- ☐ Other_____

Neurologic/Sensory
- ☐ Anxiety/Irritability
- ☐ Ataxia (incoordination)
- ☐ Confusion
- ☐ Depressed consciousness/Coma
- ☐ Diaphoresis (profuse sweating)
- ☐ Dizziness
- ☐ Fasciculation (muscle twitching)
- ☐ Headache
- ☐ Muscle pain/cramping
- ☐ Muscle weakness
- ☐ Numbness/Tingling
- ☐ Salivation
- ☐ Seizure
- ☐ Tremors
- ☐ Other_____

Ocular
- ☐ Blurred vision
- ☐ Corneal abrasion
- ☐ Irritation/Pain
- ☐ Lacrimation (tearing)
- ☐ Miosis (pinpoint pupils)
- ☐ Photophobia
- ☐ Other_____

Respiratory
- ☐ Cough
- ☐ Dyspnea (shortness of breath)
- ☐ Rhinitis (runny nose)
- ☐ Upper respiratory irritation/Pain
- ☐ Wheezing
- ☐ Other_____

Other Systemic
- ☐ Chest pain
- ☐ Excessive urination
- ☐ Fatigue
- ☐ Fever/Hyperexia
- ☐ Malaise
- ☐ Tachycardia
- ☐ Other_____

☐ Asymptomatic

☐ Pesticide-related death

Date of Death Month Day Year

Were Diagnostic or Laboratory Tests Conducted?

☐ No ☐ Yes, Completed ☐ Yes, Pending

If Completed or Pending, Please Describe:

Test:

Results (include reporting units):

Normal range or baseline used:

Treatment Rendered*

Medical Diagnosis

Remarks (Include physician observations, or other detail relevant to the case, not provided above. Additional pages may be attached.)

Pesticide Illness Report Form, Page 1

Pesticide Exposure Date (Month / Day / Year)

Name of Pesticide(s) or Active Ingredient(s)* ☐ Unknown

Location Where Pesticide Exposure Occurred (please provide street address, cross streets, or other appropriate detail)*

County of Exposure*

Describe How Patient Was Exposed to Pesticide (e.g., drift, direct spray, environmental residue, spill, ingestion)

Did Exposure Occur at Work?* ☐ Yes ☐ No ☐ Unknown

If Yes, Name of Patient's Employer

Name of Patient's Supervisor

Patient's Activity When Pesticide Exposure Occurred (Check one)

- ☐ Mixing/loading/applying pesticide
- ☐ Field work
- ☐ Flagging
- ☐ Maintaining/repairing pesticide application equipment
- ☐ Manufacturing/formulating pesticide
- ☐ Packing/processing agricultural commodities
- ☐ Transporting/storing/disposing of pesticide
- ☐ Routine indoor activity not involved with pesticide application
- ☐ Routine outdoor activity not involved with pesticide application
- ☐ Emergency response
- ☐ Other_____
- ☐ Unknown

Were Others Exposed? ☐ Yes ☐ No ☐ Unknown

Additional Detail on Pesticide Exposure Incident

Reporting Agency Name*

Street Address

Suite Number

City

State

ZIP Code

County

Telephone Number ( )

FAX Number ( )

Date Reported* (Month / Day / Year)

Person Filing Report with State

Definition of a Pesticide Illness

A pesticide illness case is a patient who is or may be suffering from pesticide poisoning or any disease or condition caused by a pesticide. The term ***pesticide*** includes any product intended to repel, kill, prevent, destroy, control, or mitigate any pest. Pesticides include insecticides, herbicides, plant growth regulators, rodenticides or other vertebrate control agents, repellents, dessicants, fungicides, miticides, disinfectants, sterilants, and sanitizers. Spray adjuvants are pesticides under California law.

Reporting Requirement

Physicians are required to report known or suspected pesticide-related illness to the **local health officer** within 24 hours (Health and Safety Code §105200). Failure to report is a citable offense and subject to civil penalty ($250).

The **local health officer** is required to immediately notify the **county agricultural commissioner** and to file the pesticide-illness report with the following **state agencies** within 7 calendar days:

Office of Environmental Health Hazard Assessment
Pesticide and Environmental Toxicology Branch
P.O. Box 4010
Sacramento, CA 95812-4010
(916) 327-7324 (Voice)
(916) 327-7320 (Fax)

Department of Pesticide Regulation
Worker Health and Safety Branch
P.O. Box 4015
Sacramento, CA 95812-4015
(916) 445-4222 (Voice)
(916) 322-8577 (Fax)

Department of Industrial Relations
Division of Labor Statistics and Research
P.O. Box 420603
San Francisco, CA 94142-0603
(415) 703-3020 (Voice)
(415) 703-3029 (Fax)

Medical Cost Reimbursements from Pesticide Drift Episodes

Food and Agricultural Code §12997.5 requires that persons responsible for pesticide drift, which causes acute pesticide illness or injury in a non-occupational setting that requires emergency medical transport or treatment, be liable to the individual harmed or to the medical provider for the immediate costs of uncompensated medical care. The acute pesticide illness or injury must result from a pesticide use violation where the pesticide was used for agricultural commodities. For more information, visit the Department of Pesticide Regulation website at http://www.cdpr.ca.gov/docs/county/sb391.pdf.

Confidential Patient Medical Information Requirements

This document contains confidential medical information, subject to federal and state law. Submission as prescribed will not violate the Health Insurance Portability and Accountability Act of 1996, or HIPAA (Pub. L. 104-191; 45 CFR Part 160 and Part 164, Subparts A and E). Information is confidential pursuant to Cal. Const. Art. 1, §1; Gov. Code §6254(c); and Civil Code §1798 et seq.

Reporting of known or suspected pesticide illness is mandatory. Use of this exact form is not required, but it is provided for data standardization.

For additional forms, please visit: http://www.oehha.ca.gov/pesticides.

Thank-you for reporting a known or suspected pesticide-related illness!

Pesticide Illness Report Form, Page 2