Flyers Beware:
Pesticide Use on International and
U.S. Domestic Aircraft and Flights

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Northwest Coalition for Alternatives to Pesticides
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Summary

Pesticides are commonly used on both cargo planes and passenger aircraft in the U.S. and in other countries. Pesticides are used in cargo holds, and in unoccupied or occupied passenger cabins, galleys and cockpits. In some cases airlines spray voluntarily, while in other cases, they spray to comply with U.S. regulations or the requirements of other countries. Pesticides can be applied by airline personnel or by commercial pest control companies as part of regularly scheduled maintenance procedures. In addition, pesticides are sometimes sprayed by airline or airport personnel immediately before, during, or after flights. Many pesticide products with a wide variety of active ingredients are registered in the U.S. for use on aircraft. Active ingredients of products that are commonly used on aircraft include d-phenothrin (also called sumithrin), permethrin, and resmethrin.

Airplane passenger cabins are already noted for their poor air quality due to the lack of adequate ventilation and restrictions on intake of fresh air during flights. Up to 50 percent (or more) of the air in passenger cabins of newer generation aircraft is recycled (Oberstar, 1994; Nadler, 1994; DeFazio, 1994; Maki, 1994). Deliberately introducing intentional poisons into this enclosed and poorly ventilated environment creates additional and unnecessary health hazards for all airline passengers. Infants, young children, pregnant women, asthmatics, cancer patients, and other sensitive individuals may be at special risk.

If you are a passenger or crew member who wants to know if pesticides will be used on a particular plane before or during a particular flight, you will need to contact the airline directly and ask about both discretionary and required spraying. This publication can guide you to people at specific airlines knowledgeable about pesticide spray practices. It also provides contact information for officials at several U.S. government agencies who are knowledgeable about spraying requirements of the U.S. and of foreign countries (see How to get more information sections, pgs. 14-15).

The Northwest Coalition for Alternatives to Pesticides (NCAP) urges passengers and flight crew members to contact airlines, government agencies, and tourism bureaus in the U.S. and other countries to express their concerns about pesticide use on aircraft. It is time for U.S. airlines to implement nontoxic pest prevention and control alternatives, and for the U.S. government to put greater pressure on other countries to revise their regulations to prohibit or discourage the use of hazardous pesticides on aircraft, including both in-flight and “residual” sprays. Pesticide labels on U.S.-registered products need to be revised to require long reentry intervals and adequate ventilation for aircraft uses. Airlines also need to notify passengers at the time of ticket purchase, and at the time of boarding, if pesticides will be used on or immediately prior to a flight, or if the plane has been or will be treated with long-lasting “residual” sprays.
Countries that require pesticide spraying in occupied passenger cabins

"Disinsection" is the term used to describe the practice of spraying pesticides on aircraft to kill “stowaway” insects. Disinsection requirements were adopted by the U.S. and numerous other countries starting in the late 1930s and 1940s, when air travel became commonplace, and concern arose that aircraft could carry agricultural insect pests or disease-carrying insects from one country or state to another. Various countries have had, or still have, disinsection (e.g., insecticide spraying) requirements for incoming, occupied aircraft. Sprays were, and in some cases still are, used in passenger cabins while passengers are still strapped in their seats, unavoidably exposing people to pesticide vapors and residues.

In 1979, the U.S. discontinued requirements for disinsection of occupied incoming aircraft after U.S. Centers for Disease Control officials concluded that there was virtually no risk of disease transmission from insects aboard aircraft (Landry, 1994; Hinman 1994), and because of concerns for the health of passengers and crew (Hinman, 1994). U.S. health officials were concerned that spraying caused undue discomfort to many passengers, and had the potential for creating acute allergic reactions, asthmatic attacks, and other allergic or respiratory problems (Hinman, 1994; Jordan, 1994). According to U.S. health officials, since routine spraying of occupied aircraft was discontinued in the U.S., there have been no outbreaks of vector-borne disease that can be attributed to imported vectors (Hinman, 1994; Jordan, 1994; Landry, 1994).

As of 1994, more than 20 countries had requirements that pesticides be sprayed in occupied passenger cabins of all incoming flights prior to the doors being opened and passengers being allowed to disembark the plane (Landry, 1994; US DOT, 1998). Recent pressure by the U.S. Department of Transportation (DOT) has convinced many of these countries to allow prior “residual” pesticide treatments (see below) in place of spraying of occupied cabins.

However, a number of countries still require insecticide spraying of occupied cabins of all incoming flights prior to allowing passengers to debark. According to a list* compiled by the DOT (US DOT, 1998), as of January 1, 1998 these countries include:

- Grenada
- Kiribati
- Madagascar
- Trinidad and Tobago

*Note that this list apparently is not complete, and is subject to change. Airlines and media sources report that spraying is also being done in occupied cabins of flights landing in India, Uruguay and possibly other countries not on the DOT list (Bonvie and Bonvie, 1998; personal communication, 1998, Delta Airlines (November); personal communication, 1998, United Airlines (November).
Passengers should contact the airlines for information about current policies and practices, and about products being used for in-flight spraying of occupied passenger cabins. Following recent EPA action, no U.S.-registered pesticide products are currently labeled for such use (US EPA, 1998-1). Most U.S. airlines seem to be using existing stocks of a previously-registered product containing **d-phenothrin**, a synthetic pyrethroid insecticide, for in-flight spraying (personal communication, American Airlines; personal communication, Delta Airlines; personal communication, United Airlines). Airlines may also be using other U.S. products not registered for this use, or products manufactured in other countries. U.S. law cannot prevent airlines from using unregistered products on planes when they are overseas.

D-phenothrin and other synthetic pyrethroid pesticides are nerve poisons (Ecobichon, 1990; Rao and Rao, 1995), and have also been reported to have reproductive and endocrine-disrupting effects (Eil and Nisula, 1990; Brody, et al, 1993; IL EPA, 1997). Information from the manufacturer of one d-phenothrin product used for in-flight spraying, Airosol Aircraft Insecticide, says that acute health hazards of exposure to the product include dizziness, skin irritation, and frostbite, and that overexposure due to inhalation may cause temporary central nervous system effects: dizziness, headache, confusion, stupor with the exclusion of oxygen and with grossly excessive overexposure. Additional warnings state that individuals with preexisting diseases of the cardiovascular system may have increased susceptibility to the toxicity of excessive exposures, and to heart irregularities (Airosol Company, 1992).
Countries that require pretreatment of passenger cabins with long-lasting “residual” insecticides

Many countries that previously required spraying of planes upon arrival and while passengers were still on board now allow airlines to use “residual” insecticide sprays instead. Residual sprays are applied prior to passenger boarding, but are intended to leave long-lasting insect-killing residues in the passenger cabin and other areas of the aircraft.

According to the DOT, countries that currently require the disinsection of passenger cabins of all inbound flights using the residual method or the application of aerosolized spray while passengers are not on board (US DOT, 1998), as of January 1, 1998 are:

- Australia
- Barbados
- Fiji
- Jamaica
- New Zealand
- Panama

Countries that require disinsection of selected flights* (as of January 1, 1998) are:

- Czech Republic
- Guam
- Indonesia
- South Africa
- Switzerland
- United Kingdom

Passengers should contact the airlines to get information about “residual” spray products that may be being used prior to flights with destinations in the above countries. Airlines can legally use pesticide products overseas on their aircraft that are not registered for use in the U.S. One U.S. airline that flies to Australia contracts to have its planes treated while in Australia with residual sprays containing the active ingredient permethrin (personal communication, United Airlines). The product that is used is intended to leave insect-killing residues on the plane for 4-6 weeks. It is applied 4-6 hours before passengers board the aircraft. Permethrin is classified as a possible human carcinogen (US EPA, 1998-3), in addition to being a nerve poison. The chemical has been shown in animal studies to cause damage to the liver (US EPA, 1997-1), and exposure can result in tremors and loss of coordination (WHO, 1989). Contact with permethrin may also produce skin sensitizations such as numbing, burning, or tingling (FMC, 1998; FMC, 1993).

*Typically, spraying is required on flights from countries where malaria, yellow fever or contagious diseases are present. Guam requires disinsection of all flights from the commonwealth of the Northern Mariana Islands, Thailand, Philippines, Korea, Indonesia, Malaysia, the Federated States of Micronesia, Papua New Guinea, Solomon Islands, and the Republic of the Marshall Islands; and, during certain months, of flights from Taiwan, Korea and Japan (US DOT, 1998).
According to a list provided by the U.S. EPA., the following permethrin-containing products are currently registered in the U.S. for use in aircraft passenger cabins: Permethrin 3.2 TC and Permethrin 3.2 PCO (MicroFlo); Sureco Synergized Permethrin Powder #1 (Verdant); and Unicorn Crawling Insect Killer IV (Unicorn Labs). However, the first two are new products not yet available on the market, and Sureco Synergized Permethrin Powder is a discontinued product, according to their manufacturers. Unicorn Labs, the manufacturer of the fourth product, did not return our phone call asking for more information about that product.

Two other U.S.-registered permethrin-containing products with labeled aircraft uses, but theoretically not for use in passenger cabins (though this is far from clear from reading the product labels), are Drag-net FT Termiticide/Insecticide and Flee Insecticide. According to information provided by the FMC Corporation, manufacturer of the above products, symptoms of overexposure to both of the products include hypersensitivity to touch and sound, tremors, and convulsions. Overexposure of animals (to Flee) via inhalation has also produced symptoms such as squinting eyes, irregular and rattling breathing, and ataxia (loss of muscular coordination). Inhalation of stoddard solvent vapors [present in both of the above products] may cause dizziness, disturbances in vision, drowsiness, respiratory irritation, and eye and skin and mucous membrane irritation (FMC, 1998; FMC, 1993).
Spraying of aircraft under U.S. Department of Agriculture regulations

Disinsection of unoccupied domestic and military aircraft still occurs in the U.S. Under U.S. Department of Agriculture (USDA) quarantine requirements, commercial passenger, cargo, and military aircraft leaving East coast and Midwestern U.S. cities and destined for specified West coast states (AZ, CA, OR, WA, ID, NV, UT) are inspected and may potentially be sprayed in an effort to control Japanese beetles. Such spraying can occur if monitoring (done in June, July and August) shows the presence of the beetles above certain thresholds at an airport, and if inspection indicates that beetles may be present in or around the plane. Usually sprays are applied to cargo planes and cargo holds only. Spraying of cargo holds is done immediately prior to flight departure, but supposedly not in the presence of passengers, crew, or animals. Such spraying is done by airline personnel or by pest control contractors hired by the airlines, but is done according to guidelines in the USDA/Animal and Plant Health Inspection Service (APHIS) quarantine Treatment Manual.

The Treatment Manual specifies two treatments for Japanese beetle (USDA/APHIS, 1998). The first treatment specifies the use of a d-phenothrin aerosol spray. While the manual does not prohibit the use of this pesticide in passenger cabins, APHIS personnel report that spraying in passenger cabins does not occur. However, it could occur on a case-by-case basis if Japanese beetles or certain other insects were found in a passenger cabin, but this would be a highly unusual event (USDA/APHIS, 1992-2).

The second treatment for Japanese beetles, that for “empty cargo holds,” specifies that Ficam W (a residual insecticide containing bendiocarb) be applied by sprayer “to areas...such as carpets, under seats, storage areas, closets, around doors, behind and under galley equipment, in cargo holds and wheel wells” (USDA/APHIS, 1998). This sounds like it could easily be misinterpreted to mean that the spray could be applied to unoccupied passenger cabins. However, according to APHIS personnel, this is not the case. Supposedly Ficam sprays are used only by one freight carrying airline due to concerns by other airlines that the chemical can harm electrical components of planes (USDA/APHIS, 1998-2).

Planes may also be sprayed for fruit flies (including medflies), gypsy moth, or other soft-bodied insects under U.S. quarantine regulations. This spraying reportedly occurs mainly in cargo holds, not passenger cabins. The Treatment Manual specifies that an aerosol resmethrin product be used for this purpose, and that “because of lingering odor, ... aerosols containing Resmethrin should not be used ...in the passenger or crew areas of commercial aircraft.” But the manual goes on to say that “particularly if Resmethrin is used, an aeration period should be added - 10 minutes if fan-assisted, and 20 minutes if no fans are used” and “CAUTION: Do not apply in presence of passengers or crew. Hold plane for 10 minutes following treatment for aeration” (USDA/APHIS, 1998). These guidelines seem to suggest that the product could be sprayed in unoccupied passenger cabins or crew areas just prior to flights, as long as these areas are aerated following the treatment. APHIS officials state that this is not the case, and that spraying does not occur in passenger cabins (USDA/APHIS, 1998-3).

In addition to spraying on planes, certain cargos are routinely or occasionally fumigated with methyl bromide or other pesticides under U.S. quarantine regulations. This spraying does not typically occur onboard the aircraft.

D-phenothrin, resmethrin, and bendiocarb are the active ingredients of some products used for Japanese beetle or other pest spraying (USDA/APHIS, 1998). D-phenothrin and resmethrin are both synthetic pyrethroid nerve poisons, and have both been shown in animal studies to cause damage to the liver. Resmethrin is a reproductive toxin (US EPA/EPCRA, 1994). Bendiocarb is a carbamate nerve poison.
Pesticides used at the discretion of the airlines

In addition to spraying of aircraft done under U.S. or other country's quarantine regulations, pesticides are also used at the discretion of the airlines in unoccupied passenger cabins, galleys, or cargo holds on domestic and international flights. Pesticides may be used in an effort to control “nuisance” pests such as crawling or flying insects, or pests such as rodents that are considered to pose a risk to flight safety.

Many U.S.-registered pesticide products are currently labeled for use in unoccupied aircraft cabins or cargo holds. According to the U.S. EPA, there are 94 products labeled for all or unspecified uses in aircraft, 52 products labeled for use in empty food handling areas (e.g., passenger cabins) of aircraft, 5 products labeled for use in food handling areas when food is present, and 155 labeled for use in nonfood or feed areas of aircraft (US EPA, 1998-2). Active ingredients of those products include various organophosphates (diazinon, chlorpyrifos), carbamates (bendiocarb, propoxur), pyrethrins, and synthetic pyrethroids (cyfluthrin, cypermethrin, d-phenothrin, resmethrin, tralomethrin, permethrin), and more. Some of these products are labeled as “residual” sprays, meaning they are intended to leave long-lasting insect-killing residues. However, it appears that at least some of these products are no longer actually being manufactured, labeled, or marketed for aircraft (or other) uses.

If a pesticide product is labeled for use in aircraft and food handling areas, there is nothing in current regulations to prohibit airlines from using it in passenger cabins immediately prior to passenger boarding. In a spot check of labels of three products currently labeled for use in aircraft passenger cabins (e.g., food handling areas), none listed requirements for ventilation following use. Only one product, Tempo 20 WP Insecticide in Packets, had specific instructions for aircraft use (see box). The label on Demand CS says to let surfaces dry before allowing children or pets to contact surfaces (Zeneca, 1994). The label on Ficam D (a dust) does not specify any reentry requirements (AgrEvo, 1995).

Tempo 20 WP Insecticide Label
(Bayer, 1996)

“For aircraft pest control, apply to cracks, crevices and other surfaces where pests have been seen or have harborage. Applications can be made to carpet and upholstered surfaces where no prolonged contact by human skin will occur. Applications should not be made when passengers or non-essential personnel are present in the immediate or treated area. All surfaces should be dry prior to re-entry by passengers or other personnel.”
Health hazards of insecticide spraying on aircraft

- **Exposure potential:** Airline passengers may be exposed to pesticides in numerous ways. People who travel on international flights may be directly sprayed with insecticides, thus being forced to breathe the vapors, as well as to face exposure through their skin and eyes. According to one flight attendant, passenger's clothing, skin, and hair are soaked with the pesticide (Fairechild, 1992). International and domestic travelers may be dermally exposed to residues of pesticide sprays or dusts remaining on carpets, upholstery, and other surfaces of aircraft cabins treated prior to passenger boarding. Passengers may also be exposed to vapors or residues through recirculated air, or to pesticides revolatilizing from carpets or fabric seat coverings. Young children may also ingest residues picked up from surfaces via hand-to-mouth contact. Passengers may also be exposed to residues of pesticides on their luggage.

While we know of no studies looking at pesticide persistence or exposure potential in aircraft, there are many studies of how long pesticide residues can last indoors that are relevant. Air concentrations of pesticide active ingredients can persist for hours following spraying in indoor environments. At one hour following aerosol spraying of two different pyrethroids in an apartment room, the active ingredients were still found to be present at 15% of the air concentration present immediately after spraying (Class, 1991). Three days following aerosol applications of 0.5% and 1% solutions of chlorpyrifos to crack and crevices, chlorpyrifos concentrations in room air were still between 4 and 8% of the levels measured immediately after application (Wright, 1978). Air concentrations of hazardous solvents in pesticide products can also be elevated for many hours following pesticide application. One study showed that air concentrations of organic solvents after certain indoor applications did not peak until 10-14 hours later (Bukowski, 1996). Another study showed that carpeting and upholstered furniture can also absorb and later release pesticides back into the air. That study found that air concentrations of pesticides actually increased over a several hour period following broadcast treatment in a carpeted room due to this effect (Fenske, et al, 1990). If pesticides are broadcast sprayed in a carpeted aircraft cabin shortly before a flight, passengers may be buckled into their seats and a flight well underway before maximum air concentrations are reached following such treatment.

When applied indoors, residues of the active ingredients of many pesticides are rapidly deposited on surfaces (Class, 1991; Wright, 1984), where they can persist for days, weeks, or even months. Of course, this is the intent with so-called "residual" sprays required by some countries - they are supposed to leave pest-killing residues in the aircraft cabin for 4-6 weeks. But other pesticide treatments done at the discretion of the airlines can also leave long-lasting residues. Residues of one synthetic pyrethroid, cyfluthrin, which is an ingredient of some pesticide products with labeled aircraft uses, were found to be reduced only slightly when measured 60 hours after spraying in a large room (Class, 1991). Studies and incidents have shown that even pesticides applied just to cracks and crevices or to baseboards around the perimeter of a room can be dispersed throughout a room by fans or forced air heating systems (Wright, 1976; Maddy, 1990). Residues of chlorpyrifos and diazinon, two organophosphate insecticides that also are ingredients of products with labeled aircraft uses, were found on nontarget surfaces for 42 days (the last day measurements were taken) following crack and crevice spray applications to dorm rooms (Wright, 1984). The persistence of pesticide residues can also be affected by factors such as light and humidity. One study found that residues of certain pyrethroids can remain unchanged for many hours in a dark environment (Class, 1991). Even if an aircraft cabin is sprayed overnight the night before a flight, pesticide residues could remain relatively unchanged prior to passengers boarding the first flight in the morning. Finally, one recent study found that when pesticides were sprayed in an unoccupied room, and toys were placed in the room after the treatment, that for at least a week following spraying, children...
could be exposed to doses of public health concern from residues that accumulated on the toys (Gurunathan, 1998). Harmful pesticide residues could similarly be expected to accumulate on toys, passengers' clothing, or carry-on baggage on a sprayed aircraft.

**Health hazards:** Pesticides are intentional poisons designed to kill insects or other “pest” organisms. Exposure to pesticides poses many known, and some as yet unknown, human health risks. These can include immediate acute effects, or longer-term chronic conditions such as cancer or reproductive abnormalities. Pesticide exposures on aircraft are of special concern given that once a flight begins, people are literally trapped and unable to leave should they begin to experience acute health problems related to the exposure. People with asthma, allergies, or other sensitivities could face life-threatening situations if symptoms are triggered by a pesticide and they are unable to remove themselves from the exposure situation.

The risks of pesticide exposure on aircraft are not just theoretical. As of May of 1994, the EPA had received reports from 6 people in separate incidents that suffered reactions to in-flight sprays. The reported health symptoms ranged from headaches and nausea to more severe cases of seizures and memory loss (US EPA, 1994). According to Congressional testimony in 1994 by the director of the Independent Federation of Flight Attendants, flight attendants have expressed concern for many years about pesticide spraying on aircraft, and passengers have complained to the EPA that the spraying has caused headaches, nausea, fatigue, seizures, and in some extreme cases, memory loss or a depressed immune system (Miller, 1994). Additional testimony from the flight attendants' union described an incident of a passenger who suffered from emphysema and who died of “acute exacerbation of chronic airways obstruction” 18 hours after being sprayed with d-phenothrin on a flight to Australia, and also the case of a retired flight attendant who filed suit against the Department of Health and Human Services maintaining that her health problems, which include liver damage and abnormal clotting of her blood, were caused by nearly 25 years of required in-flight pesticide spraying (Miller, 1994).

Other cases of actual or alleged health damage caused by aircraft spraying include a passenger who experienced an allergic reaction when sprayed on a flight to Australia (Kleiner, personal communication), a passenger who blamed exposure to airline sprays for the relapse of her leukemia (Kendall, personal communication), and a flight attendant who (along with her doctor) blames repeated exposure to airline sprays for her chemical sensitivity. This flight attendant reported that she would lose motor coordination and yellow pus would drip from her eyes following exposure to the sprays. She remains unable to work, and continues to experience seizures, internal bleeding, rashes, fevers and more (Fairechild, personal communication). Yet another flight attendant has initiated a class action lawsuit against one airline, alleging that repeated exposure to the sprays damaged her immune system, resulting in several serious diseases and multiple chemical sensitivity (Gray, personal communication).

Many of the insecticides used on aircraft are **synthetic pyrethroid**, **organophosphate**, or **carbamate** classes of nerve poisons. Infants and young children are especially vulnerable to the effects of nerve poisons because their brains and nervous systems are still developing. The National Academy of Sciences, in a 1993 report, stated that “the data strongly suggest that exposure to neurotoxic [e.g., nerve...
Health hazards of selected pesticides commonly used on aircraft

<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Health hazards</th>
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<tbody>
<tr>
<td>d-phenothrin</td>
<td>Synthetic pyrethroid nerve poison (Ecohichon, 1990; Rao and Rao, 1995; UNEP, 1990-1). Causes liver damage in animal studies (WHO, 1990). Has reproductive and endocrine disrupting effects (Eil and Nisula, 1990; Brody, 1983). Exposure to certain d-phenothrin-containing sprays can cause symptoms including eye irritation, tearing and blurred vision, skin irritation, nasal and respiratory irritation, nausea, cramps and vomiting, fatigue, tremors, lack of coordination (McLaughlin Company, 1989), and temporary central nervous system effects, dizziness, headache, confusion, and stupor (Airosol Company, 1992).</td>
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<tr>
<td>resmethrin</td>
<td>Synthetic pyrethroid nerve poison. Exposure symptoms include eye irritation, numbness, itching, burning, incoordination, twitching, loss of bladder control, and seizures (ExToxNet, 1993). Reproductive toxin (increased number of stillborn pups, reduces pup weight) (UNEP, 1989; US EPA/EPCRA, 1994). In animal studies, causes liver damage (US EPA/EPCRA, 1994).</td>
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<tr>
<td>pyrethrin(s)</td>
<td>Nerve poison (ExToxNet, 1994). Reproductive and endocrine-disrupting effects (Eil and Nisula, 1990). Exposure symptoms include skin irritation, itching, burning (ExToxNet, 1994). In rats, causes fetal loss (Khera, 1981) and low birthweights (ExToxNet, 1994).</td>
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<tr>
<td>piperonyl butoxide</td>
<td>Classified by EPA as a possible human carcinogen (US EPA, 1998-3). In animal tests, causes liver tumors and lung damage, hemorrhages, and anemia (Takahashi, 1994).</td>
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<tr>
<td>chlorpyrifos</td>
<td>Organophosphate nerve poison (US DHHS, 1995). Reported exposure symptoms include long-term neurological symptoms such as visual disturbances, muscle weakness, confusion, short-term memory loss, depression, difficulty concentrating, and chemical sensitivity (US EPA, 1997-2). Causes genetic damage in animal tests and tests on human cells (US DHHS, 1995). Caused fetal death and reduced birthweights in rats (Muto, 1992). Multiple cases of undescended testicles have been linked to prenatal exposure to chlorpyrifos (Sherman, 1996).</td>
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Poisoning] compounds at levels believed to be safe for adults could result in permanent loss of brain function if it occurred during the prenatal or early childhood period of development” (NAS, 1993).

Organophosphates are efficiently absorbed by inhalation, ingestion, and skin penetration. Symptoms of acute exposure to organophosphates include headache, nausea, dizziness and anxiety, followed by muscle twitching, weakness, tremor, incoordination, vomiting, abdominal cramps, diarrhea, tightness in the chest, and coughing. Severe organophosphate poisonings can lead to incontinence, paralysis, unconsciousness, convulsions, and life-threatening respiratory failure (US EPA, 1989).

Symptoms of acute exposure to synthetic pyrethrins include: stinging, burning and itching of the skin; and tingling progressing to numbness. Large doses can cause incoordination, tremor, salivation, vomiting, diarrhea, and irritability to sound and touch (US EPA, 1989). Acute exposure symptoms such as migraine and Raynaud’s syndrome have also been reported following indoor and garden application of pyrethrins and pyrethroids (Class, 1991).

Exposure to these classes of pesticides can also cause longer-term, chronic conditions. In 1994, EPA received over two hundred reports of human health effects involving just one organophosphate pesticide, chlorpyrifos (Dursban), which has labeled uses on aircraft. DowElanco, Dursban’s manufacturer, belatedly notified EPA of these cases where exposed people sued the company after experiencing long-term...
neurological symptoms such as visual disturbances, muscle weakness, confusion, short-term memory loss, depression, difficulty concentrating, chemical sensitivity, and more (US EPA, 1997-2).

Epidemiological studies done by the National Cancer Institute and others have linked home and yard pesticide use with increased risk of several common childhood cancers. Elevated rates of childhood brain cancer have been linked to use of pesticide bombs, flea collars, no-pest strips, flea and tick sprays, and pesticides to control garden insects, head lice, and termites (Davis, 1993; Pogoda, 1997). Elevated rates of childhood leukemia have been associated with pesticide use in the home and garden, and with no-pest strips (Lowengart, 1987; Buckley, 1989; Buckley, 1994; Leiss, 1995; Meinert, 1996). Commonly-used home and garden insect sprays have many of the same active ingredients (organophosphates, carbamates, and synthetic pyrethroids) found in aircraft spray products. Some products labeled for home insect control uses are also labeled for aircraft uses.

Several insecticide active ingredients commonly used on aircraft, including permethrin, cypermethrin, and piperonyl butoxide, are classified by the US EPA as possible human carcinogens (US EPA, 1998-3). Others, such as resmethrin, are classified as reproductive hazards. (US EPA/EPCRA, 1994). Still others, including cypermethrin and permethrin, are known or suspected endocrine (hormone) disruptors (IL EPA, 1997).
What you can do to change pesticide use practices on aircraft, or to prevent your own exposure

NCAP urges air travelers to voice their concerns about pesticide use on aircraft to their Congressional representatives, to government agencies, to U.S. and foreign airlines, and to international tourism bureaus (see addresses and contact numbers below, and on the following pages).

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<tr>
<th>Ask U.S. and foreign governments and airlines to:</th>
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<tr>
<td>• <strong>Halt</strong> any requirements for, or use of, <strong>insecticide sprays in occupied passenger cabins</strong>. The U.S. Centers for Disease Control has determined that this practice is not effective, and poses potential health hazards to airline passengers.</td>
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<td>• <strong>Require the use of alternative pest prevention and control techniques</strong>, including monitoring, trapping, vacuuming, and pest exclusion measures in passenger cabins or galleys, with “least-toxic” chemical pesticides used only as a last resort, and in the smallest amounts possible (e.g., baits or spot treatments).</td>
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<td>• <strong>Implement minimum 48 hour reentry requirements</strong> (e.g., requirements that planes be ventilated and not boarded for at least 48 hours) after spraying in passenger cabins or galleys.</td>
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<td>• <strong>Provide advance notification</strong> if sprays are used in passenger cabins or galleys within 72 hours prior to a domestic or international flight, or if they will be used during any leg of the flight. Also notify passengers if long-lasting “residual” pesticides have been or will be used in the passenger cabin within 6 weeks of the flight. This is especially important for sensitive individuals so that they can take appropriate precautions to avoid or minimize exposure.</td>
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**Congress**

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<th>Honorabile Senator ______</th>
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<tr>
<td>United States Senate</td>
<td>United States House of Representatives</td>
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<tr>
<td>Washington, DC 20510</td>
<td>Washington, DC 20515</td>
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<tr>
<td>(202) 224-3121</td>
<td>(202) 224-3121</td>
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**U.S. Government Agencies**

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<td>U.S. Department of Transportation (P-13)</td>
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<td>400 7th St. SW</td>
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<tr>
<td>Washington, DC 20590</td>
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<td>(202) 366-4849</td>
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<tr>
<th>Office of Pesticide Programs</th>
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<tr>
<td>U.S. Environmental Protection Agency (EPA)</td>
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<tr>
<td>401 M Street SW</td>
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<tr>
<td>Washington, DC 20460</td>
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<tr>
<td>(703) 305-7090 (Marcia Mulkey, Director)</td>
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<tr>
<td>(703) 305-7092 (Stephen L. Johnson, Deputy Director)</td>
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International Tourism Bureaus


**Barbados:** Barbados Board of Tourism, 800 Second Ave., New York, NY 10017, (212) 986-6516.

**Grenada:** Grenada Department of Tourism, 820 Second Ave., New York, NY 10017, (212) 687-9554.

**Jamaica:** Jamaican Tourist Board, 801 Second Ave., New York, NY 10017, (212) 688-7650.

**New Zealand:** New Zealand Tourist Office, 501 Santa Monica Blvd., Santa Monica, CA 90401, (800) 388-5494.

**Trinidad and Tobago:** Trinidad and Tobago Tourist Board, 25 West 43rd Street, New York, NY 10036, (212) 719-0540.

**Other Countries:** If you have access to the internet, use your browser to search for Web pages of the government tourism bureaus of other countries of interest, or try these Web sites for international tourism contacts for numerous countries:

If you plan to take a flight:

- **Contact the FAA, the airline, and the tourism bureau of the destination country** (if it is an international flight). Ask about spray practices, but be aware that ticket agents and other airline personnel do not always know about disinsection requirements or have accurate information. (See list below for contacts at major U.S. airlines.) Ask for information about any use of pesticides on their planes, but especially about any “residual” or in-flight spraying done as part of U.S. or foreign quarantine requirements. Note that even if your destination is to a country that does not require spraying, because planes may be used on different routes, you could be on a plane that has been treated with long-lasting “residual” sprays because it is also used on flights to other countries that do require such treatments.

- If you are asthmatic or have another medical condition that puts you at special risk from pesticide exposure, **contact the airline** well in advance of your flight. Some airlines have worked with passengers to plan an itinerary that will help them avoid flying on planes recently treated with residual sprays. Note that generally you will **NOT** be able to avoid in-flight spraying if your destination is a country that requires it, since this spraying is done at the “top-of-descent” while the plane is still in the air. Even if your flight is to a country that is not on the DOT list of countries requiring such spraying, you would be well advised to get a letter from the airline stating that in-flight spraying will not occur, since it is known to happen routinely in some countries that are not on the list (e.g., India, Uruguay). Consider changing your travel plans if you cannot get satisfactory assurances that you can avoid pesticide exposure. Be sure to let the airline and the destination country's tourism bureau know of the reason for your change in plans, if you choose this option.

- Some passengers have gotten letters from their doctors stating that they should not be exposed to pesticides because of their condition, and need to be allowed to disembark prior to spraying. They have sent copies of these letters to the airline well in advance of the trip, and carried the letter with them on the flight. However, be aware that such letters have usually **NOT** prevented exposure.
How to get more information about the pesticides used on aircraft

U.S. Airlines

For more information on what pesticide products are sprayed on particular aircraft and flights, contact the airlines directly. Ask about any required pesticide use, as well as spraying that might be done at the discretion of the airline. Ask them where, when, and how often pesticides are used (e.g., overnight, just before passengers board, during the flight, at U.S. airports, at overseas airports, before each flight, daily, weekly, monthly?). For each product used, ask for product names, active ingredients, labels, and Material Safety Data Sheets). Be sure to ask if products are registered for use in the U.S.

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<th>Air Carrier</th>
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<tbody>
<tr>
<td>American Airlines</td>
<td>Michael Brooks</td>
<td>(817) 967-2342</td>
<td><a href="mailto:michael_brooks@amercorp.com">michael_brooks@amercorp.com</a></td>
</tr>
<tr>
<td>Continental Airlines</td>
<td>Dave Messing</td>
<td>(713) 834-5000</td>
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</tr>
<tr>
<td>Delta Airlines</td>
<td>John C. Marshall</td>
<td>(404) 714-0063</td>
<td><a href="mailto:john.c.marshall@delta-air.com">john.c.marshall@delta-air.com</a></td>
</tr>
<tr>
<td>Northwest Airlines</td>
<td>Kevin Florence</td>
<td>(612) 727-4840</td>
<td><a href="mailto:kevin.florence@nwa.com">kevin.florence@nwa.com</a></td>
</tr>
<tr>
<td>Trans World Airlines</td>
<td>Beatrice M. Lutz</td>
<td>(314) 429-8966</td>
<td><a href="mailto:blutz@twa.com">blutz@twa.com</a></td>
</tr>
<tr>
<td>United Airlines</td>
<td>Hector Sandoval</td>
<td>(847) 700-7375</td>
<td><a href="mailto:hsandoval@ual.com">hsandoval@ual.com</a></td>
</tr>
<tr>
<td>US Airways</td>
<td>Daniel Dunn</td>
<td>(412) 747-3695</td>
<td><a href="mailto:dwdunn@usairways.com">dwdunn@usairways.com</a></td>
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Most airlines have Web sites, and some offer on-line forms that you can use to e-mail them comments or requests for information.

U.S. Government Agencies

For more information about U.S. regulations governing pesticide spraying of aircraft, or international disinsection requirements, contact:

- Arnold Konheim
  **U.S. Department of Transportation (P-13)**
  400 7th St. SW
  Washington, DC 20590
  (202) 366-4849

For information about U.S.-registered pesticide products labeled for use on aircraft, and about U.S. policies and regulations governing pesticide use on aircraft:

- **U.S. Environmental Protection Agency**
  Denise Kearns, US EPA Public Relations: (202) 260-4376
  Marion Johnson, Product Manager, Insecticide Branch, US EPA: (703) 305-6788
  Earl Ingram, US EPA Freedom of Information office: (703) 305-5456

For information about pesticide use on aircraft under U.S quarantine regulations, contact:

- **USDA/APHIS/Plant Protection and Quarantine Division** (Frederick or Riverdale, Maryland)
  Stacey Carter-Lane, USDA/APHIS Public Affairs (Riverdale): (301) 734-3266
  Phillip Grove, author of USDA/APHIS quarantine Treatment Manual: (301) 663-0342
  Bob Schall, author of Japanese beetle treatment guidelines: (301) 663-8598
  Ron Milberg, Japanese beetle program: (301) 340-3315
How to get more information about the hazards of pesticide chemicals

Once you have information on the name of a U.S.-registered pesticide product (or active ingredient of a pesticide product) used by an airline, the following sources can offer assistance researching the hazards of the particular product or chemical.

Northwest Coalition for Alternatives to Pesticides (NCAP)

- Northwest Coalition for Alternatives to Pesticides (NCAP)
  PO Box 1393
  Eugene, OR 97440
  (541) 344-5044
  fax: (541) 344-6923
  Web: http://www.efn.org/~ncap
  e-mail: info@pesticide.org

NCAP offers a pesticide research service, and summary factsheets on many pesticide active ingredients. Some factsheets are available for viewing or downloading from our Web site at http://www.efn.org/~ncap/factsheets.html.

U.S. Environmental Protection Agency (EPA)

- National Pesticide Telecommunications Network: 1 (800) 858-7378. This EPA-sponsored service can help research U.S.-registered pesticide products.

- U.S. Environmental Protection Agency. The agency can provide information about the hazards of particular pesticide active ingredients, or of U.S.-registered pesticide products labeled for use on aircraft.
  Marion Johnson, Product Manager, Insecticide Branch, US EPA: (703) 305-6788.
References

AgrEvo. 1995. Label. Ficam D. Wilmington, DE.
Bonvie and Bonvie. 1998. On board pesticide use declines, but risks to passengers may remain. The Seattle Times, April 5.
Landry, JL. (President, Air Transport Association). Testimony before US Congress Subcommittee on Aviation (May 18).
and Toxicol. Vol. 114, p. 117.
USDA/APHIS. 1998-2. Personal communication with Christine Markham, Regional Program Manager, Plant Protection and Quarantine Division (October).
USDA/APHIS. 1998-3. Personal communication with Mike Steffan, Fruit fly program, Plant Protection and Quarantine Division (October 26).
US EPA. 1998-2. List of Active Products For Site: Aircraft (All or Unspecified), Aircraft (Feed/Food-Empty), Aircraft (Feed/Food-Full), Aircraft (Non Feed/Food). Office of Prevention, Pesticides, and Toxic Substances, Office of Pesticide Programs, Public Information and Records Integrity Branch, produced 9/21/98.
and Community Right to Know Act, available online at http://frwebgate3.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=372&SECTION=65&type=TEXT


