Preliminary Report

2006 Washington State Department of Health Pesticide Illness Monitoring

Approved by the Pesticide Incident Reporting and Tracking Review Panel, January 2008.

Washington State Department of Health
Division of Environmental Health
Office of Environmental Health Assessments

Preliminary Report

2006 Washington State Department of Health Pesticide Illness Monitoring

Approved by the Pesticide Incident Reporting and Tracking Review Panel, January 2008.

To obtain copies or for additional information, please contact:

Cynthia Lopez, Dr.PH
Manager, Pesticide Program
PO Box 47846
Olympia, Washington 98504-7846

Phone: 360.236.3340
Fax: 360.236.2261
Email: cynthia.lopez@doh.wa.gov

The annual report is available in electronic format on the Internet at http://www.doh.wa.gov/ehp/PIRT/default.htm#pirtreports. Persons with disabilities may request this report in other formats by calling: 1.800.525.0127 (voice) or 1.800.833.6388 (TTY/TDD).

Report suspected pesticide-related illness to Washington State Department of Health at the toll-free number 1.888.586.9427.

2006 Pesticide Illness Monitoring

In this preliminary report, Washington State Department of Health's Pesticide Program presents data gathered in 2006 and analyzed in 2007.

Background

The Department of Health (DOH) Pesticide Program investigates reports of illnesses related to pesticide exposure. DOH and others use data collected from these investigations to identify public health problems and develop strategies for prevention.

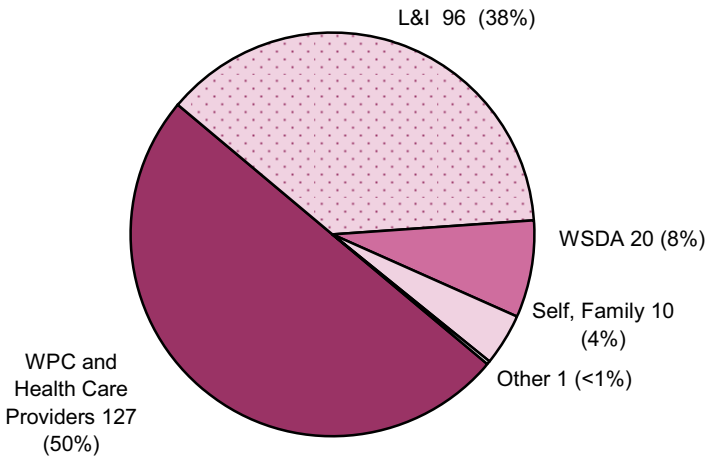
This preliminary DOH report on 2006 pesticide-related data describes sources of case reports, classification and severity of investigated cases, and the number and location of DOH investigations. A more detailed report, including the Pesticide Program's summary of 2006 pesticide cases and 2007 pesticide illness prevention activities will be available in the final 2007 Pesticide Incident Reporting and Tracking Review Panel Report in mid-2008. DOH presents data on occupational, agricultural, and non-agricultural cases here.

Sources of Case Reports

DOH receives reports of suspected pesticide illness events from numerous sources, including Washington Poison Center (WPC), Department of Labor and Industries (L&I) Claims Administration Program, Washington State Department of Agriculture (WSDA), health care providers, and others (Figure 1). More than one agency may report the same illness event. An event may involve exposure to one or more individuals. Each individual exposure is investigated by Pesticide Program staff as a separate case. Figure 1 shows the number of individual cases investigated and the proportion of report sources based on the first report received by DOH per case.

Figure 1. Sources of Case Reports,* 2006

n = 254 cases investigated



*Although some cases were reported by more than one agency or organization, DOH defines source by the first entity submitting the report to DOH.

Electronic reporting from WPC provided approximately 50 percent of the total reports, more than any other source. Electronic reporting from L&I Worker's Compensation claims unit was the second largest source, providing 38 percent of reports.

Case Investigation Criteria

DOH receives report information from more than one source. Any single event may involve multiple people who experience pesticide illness. DOH reviews all referred reports and investigates those which meet the following criteria:

- A pesticide exposure is reported.
- Symptoms are reported.
- At least one individual involved saw a health care provider.
- The pesticide exposure occurred during the last three months.
- The pesticide exposure occurred in Washington State.
- The pesticide exposure was not a suicide attempt.

DOH occasionally investigates cases of special circumstance even if all criteria are not met. Examples are: unusual exposures to children, incidents involving multiple ill people, moderate to severe illness or injuries for which the individual did not seek health care, and cases referred by another state agency for co-investigation with DOH. Although many disinfectants are regulated as pesticides

under federal law, DOH does not investigate disinfectant-related injury unless the product is specifically being used as a fungicide (e.g., sprayed on mold).

Classification of Investigated Cases

DOH Pesticide Program investigators interview individuals, obtain pesticide application and medical records, and, at times, conducts field visits. Investigators use these data to determine the likelihood that reported symptoms are related to a pesticide exposure. Investigators classify cases using documentation of exposure and health effects, and evaluation of the causal relationship. DOH uses the National Institute for Occupational Safety and Health (NIOSH) Case Classification System to distinguish between Definite, Probable, Possible, Suspicious, Insufficient Information, and Unlikely cases (Appendix A). Minimum criteria for assignment to Definite, Probable, and Possible classifications include: symptoms are characteristic of known toxicological effects of the pesticide, and the time between exposure and symptom onset is consistent. Further description of Definite, Probable, and Possible (DPP) cases is provided in Table 1.

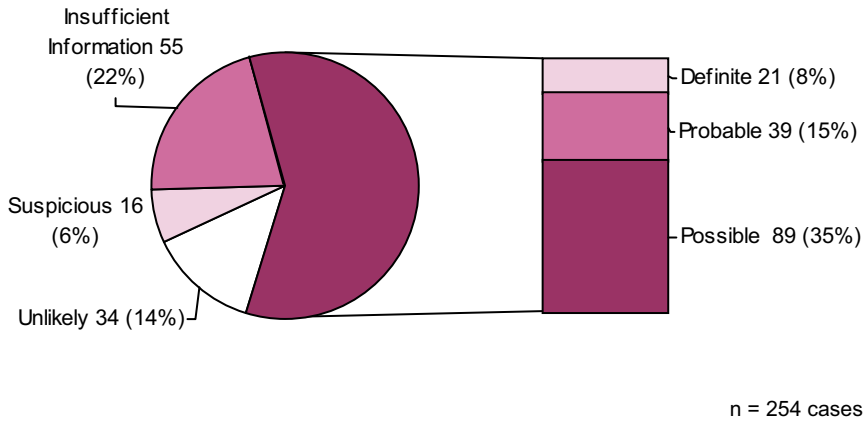
Table 1. Classification Criteria of Definite, Probable, and Possible Cases

	Evidence of Exposure	Evidence of Health Effects
Definite	Laboratory, clinical, or environmental evidence corroborates exposure, and →	Two or more post-exposure health effects (one a sign*) or lab findings are reported by a licensed health care provider.
Probable	Laboratory, clinical, or environmental evidence corroborates exposure, and →	Two or more post-exposure symptoms** are reported by the individual or a health care provider.
	Evidence of exposure is based on report from case, witness, application, observation of residue or contamination, and →	Two or more post-exposure health effects (one a sign) or lab findings are reported by a licensed health care provider.
Possible	Evidence of exposure is based on reports from case, witness, application, observation of residue or contamination, and →	Two or more post-exposure symptoms** are reported by the individual or a health care provider.

**Signs are considered objective evidence of illness and are observable on examination by a health care provider (e.g. low heart rate, cough, rash, depressed cholinesterase activity).*
***Symptoms are considered subjective evidence of illness and may not be observable on examination by a health care provider (e.g. headache, nausea, dizziness).*

In 2006, investigators classified 149 (58%) of the 254 cases as definitely, probably, or possibly related to pesticide exposure. Figure 2 shows the classification of cases for 2006.

Figure 2. Classification of Investigated Cases by Number and Percentage, 2006



The numbers of DPP cases for the years 2002 through 2006 are listed in Table 2.

Table 2. Definite, Probable, and Possible (DPP) Case Classification, 2002 – 2006

Classification	2002	2003	2004	2005	2006
Definite	50	69	63	49	21
Probable	60	53	55	48	39
Possible	64	62	86	91	89
Total DPP	***174***	***184***	***204***	***188***	***149***
All Cases Reported	270	275	269	252	254
Percent DPP	64%	67%	76%	75%	58%
Percent Insufficient Information	17%	17%	14%	17%	22%

The percentage of cases classified as DPP increased between 2002 and 2005, and then decreased in 2006. One reason for this change may be the increase in cases classified as having insufficient information in 2006.

DOH investigators classified 55 of the 254 cases as insufficient information. Common reasons that investigators classify cases as having insufficient information include: the person or provider reports only one symptom; investigators cannot determine the type of pesticide involved; investigators cannot sufficiently characterize exposure details (e.g., cannot reach the person for an interview); or, medical and/or spray records are inconsistent with the patient's illness report. None of these four reasons result in automatic insufficient information classification. However, these factors increase the likelihood that an investigator would classify the case as having insufficient information. The number of insufficient cases may also be higher in 2006 as the Pesticide Program lost two full-time investigators mid-season. Remaining staff lacked resources (primarily time) to locate difficult-to-reach individuals and employers.

Severity of Medical Outcome

DOH uses the NIOSH Severity Index for classifying signs and symptoms associated with pesticide cases (Appendix A). The mild category includes transient and spontaneously resolving symptoms such as nausea, vomiting, shortness of breath, headache, dizziness, and skin or eye irritation. With mild severity cases, there is typically minimal time loss (three days or less) from work or normal activities. Even relatively pronounced symptoms such as profuse sweating, ataxia, peripheral neuropathy, eye pain, and difficulty breathing can be classified as mild if a health care provider did not directly observe the symptoms.

Moderate illness or injury includes signs and symptoms which are pronounced and/or prolonged and in most cases must be observed by a health care provider. These include second and third degree skin burns, ocular burns, systemic symptoms such as altered heart rate, slurred speech, and asthma attack. For moderate cases, the time loss from work or normal activities is usually three to five days.

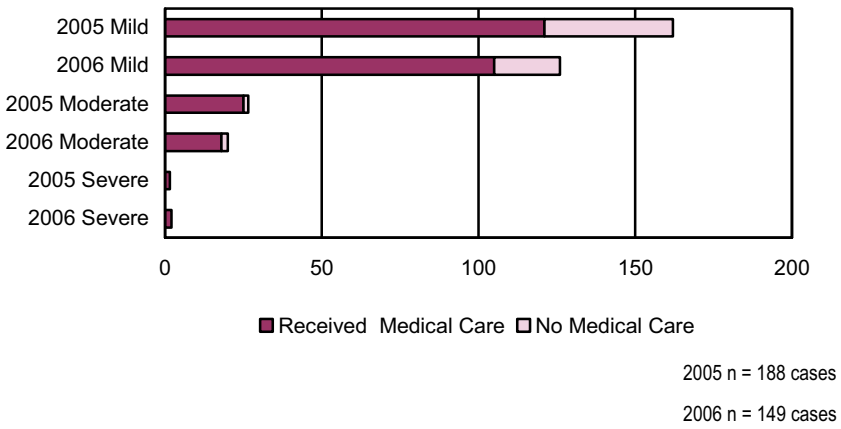
Cases are classified as severe when the illness or injury is considered life threatening; these cases typically require treatment or hospitalization to prevent death. Signs and symptoms include, but are not limited to: coma, cardiac arrest, renal failure, and/or respiratory depression. The individual often sustains substantial loss of time (more than five days) from regular work.

The death classification describes a fatality from exposure to one or more pesticides.

In 2006, 126 (85%) of the 149 definite, probable, or possible DOH cases were classified as mild. Twenty (13%) cases were classified as moderate and two (1%) cases were classified as severe (Figure 3). There was one pesticide-related death in 2006. This death was of a 64-year-old female with chronic obstructive pulmonary disease who sprayed her home for wasps using a pyrethroid product that dripped over her hands and arms. Although she received emergency medical care and was hospitalized, she died nine days after exposure.

These results are compared to 2005 data. In 2005, 161 (86%) of the 188 definite, probable, or possible DOH cases were classified as mild. Twenty-six (14%) cases were classified as moderate and one (0.5%) case was classified as severe. The absolute number of DPP cases is smaller in 2006 than in 2005, but the percentages for the mild and moderate categories are similar.

Figure 3. Severity of Medical Outcome, 2005 and 2006 DPP Cases



2005 n = 188 cases

2006 n = 149 cases

Of the 149 DPP cases in 2006, 129 (87%) received medical care for their symptoms. Of the 188 DPP cases in 2005, 146 (78%) received medical care for their symptoms. Medical care is defined as a physician office, clinic, hospital, or emergency room visit, or assistance from an emergency responder. This medical care definition differs slightly from having visited a health care provider as emergency responders are not considered providers.

Number and Location of Investigated Cases

Number of Events

During 2006, the Pesticide Program investigated reports of 232 events involving 254 cases of potential pesticide illness (Figure 4).

Figure 4. Total DOH Reported Events and Cases, 2001 – 2006

Number of Persons Involved in DPP Cases

There were 139 events that involved 149 definite, probable, or possible cases. Of the 139 events, 131 (94%) involved one individual and seven (5%) involved two individuals. One event involved four individuals.

In comparison, in 2005 there were 160 events involving 188 definite, probable, or possible cases. Of the 160 events, 147 (92%) involved one individuals, eight involved two individuals, three involved three individuals, one involved four individuals, and one pesticide drift incident involved 12 symptomatic individuals.

Location

In 2006, 26 of the 39 counties in Washington had cases that were classified as definitely, probably, or possibly related to pesticide exposure. Table 3 lists the ten counties with the most reported cases. Of the 149 DPP cases, 116 (78%) came from these ten counties. Seventy-seven percent (4.8 million) of the state population (6.2 million) resides in these ten counties. Table 4 lists the ten counties with the most reported cases adjusted for the population of those counties.

Table 3. Top Ten Counties with the Most Reported DPP Cases, 2006

County	DPP Cases	DPP Cases per 100,000 Population	Population
King	23	1.24	1,861,300
Spokane	17	3.77	451,200
Yakima	17	7.26	234,200
Grant	17	20.61	82,500
Snohomish	11	1.60	686,300
Pierce	8	1.01	790,500
Clark	7	1.69	415,000
Benton	6	3.68	162,900
Whatcom	5	2.66	188,300
Chelan	5	0.71	71,200

King and Spokane counties have the most reported DPP cases. However, when the population of the county is considered, they fall out of the top ten counties with DPP cases because these counties are more heavily populated. Table 4 lists the ten counties with the most reported cases adjusted for county population.

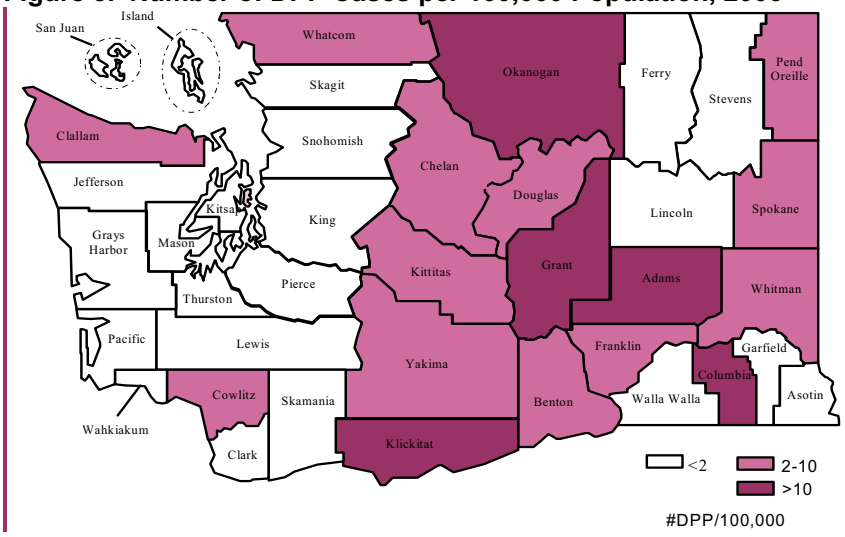
Rural counties with smaller populations appear to have the most DPP cases adjusted for population. When using both methods, the counties of Grant, Yakima, and Chelan remain in the top ten.

Table 4. Top Ten Counties with the Most DPP Cases per 100,000 Population, 2006

County	DPP Cases per 100,000 Population	DPP Cases	Population
Columbia	48.78	2	4,100
Grant	20.61	17	82,500
Okanogan	12.56	5	39,800
Adams	11.36	2	17,600
Klickitat	10.05	2	19,900
Pend Oreille	7.94	1	12,600
Yakima	7.26	17	234,200
Chelan	7.02	5	71,200
Franklin	5.93	4	67,400
Whitman	4.68	2	42,700

Figure 5 shows the location of definite, probable or possible cases adjusted for population for 2006. More of the 149 DPP cases occurred in eastern Washington (82) than in western Washington (67).

Figure 5. Number of DPP Cases per 100,000 Population, 2006



Agricultural and Non-Agricultural Cases

Table 5 displays the distribution of cases defined as definite, probable, or possible by agricultural and non-agricultural setting from 2001 through 2006.

Table 5. Annual Agricultural and Non-Agricultural DPP Cases, 2001 – 2006

Year	Agricultural	Non-Agricultural	Total Cases
2001	58 (48%)	62 (52%)	120
2002	75 (43%)	99 (57%)	174
2003	73 (40%)	111 (60%)	184
2004	64 (31%)	140 (69%)	204
2005	77 (41%)	111 (59%)	188
2006	44 (30%)	105 (70%)	149

Since 2000, the number of non-agricultural DPP cases has increased as a percentage of the total. This increase is partly due to improvements in reporting from the WPC which receives more residential calls from urban areas.

Agricultural cases occur when the pesticide application is intended for agricultural commodities such as fruit and field crops, nursery, livestock, and forest operations. Agricultural cases include exposure during pesticide handling, exposure to drift or foliar residues of an agricultural application, and spills at agricultural storage facilities. Typical non-agricultural cases involve residential use of pesticides and may include a spill or splash while opening and pouring pesticides, or wind blowing spray during the application.

The number of agricultural DPP cases reported in the last six years has ranged from 30 percent to 48 percent of total DPP cases. Although agricultural cases are 37 percent of the case total for 2006, they represent a higher percentage (40%) of cases classified as insufficient information (Table 6). For the final report, DOH will aggregate several years of data to determine if this finding is statistically significant. In general, agricultural cases may be more likely to be classified as insufficient information because they are more difficult to investigate.

Table 6 shows the number of agricultural and non-agricultural cases classified by DOH as insufficient information. Sixty percent of cases with this classification were non-agricultural and 40 percent were agricultural. DOH is looking at these cases more closely to determine what barriers exist to obtaining enough information to definitively classify cases.

Table 6. Non-Agricultural and Agricultural Cases Classified as Insufficient Information, 2006

Type of Case	All Other Classifications *	Insufficient Information	Total Cases
Non-Agricultural	126 (63%)	27 (60%)	153 (63%)
Agricultural	73 (37%)	18 (40%)	91 (37%)
Total	199 (100%)	45 (100%)	244 (100%) *

** In ten instances, case coding of agricultural versus non-agricultural was unknown.*

Seasonality of Agricultural and Non-Agricultural Events

In 2006, 70 (47%) of all DPP cases occurred in April through June, and 48 (32%) occurred in July through September (Table 7). For non-agricultural events, this pattern corresponds to periods when people are most likely to control landscape weeds and insects, garden pests, and home insect pests. The seasonal pattern for agricultural cases appears to have narrowed during the last two years. In both 2005 and 2006, the majority (68% and 66%, respectively) of investigated agricultural-related cases occurred in the three months from April through June. This differs from 2004 where a similar percentage (67%) of agricultural events occurred in the six months from April to September. This may be due to a shift in pesticide use patterns in orchards. Late season azinphos-methyl applications are being supplanted by use of spinosad and acetamiprid products, which have much lower acute toxicity. Based on U.S. Department of Agriculture National Agricultural Statistics Service (September, 2006) the total amount of azinphos-methyl applied to apples in Washington dropped over 30 percent from 2003 to 2005. This drop was due to a decrease in apple acreage treated, and to a 20 percent drop in the number of annual applications to the same acreage. During the same time, acetamiprid treatments on apples increased 64 percent, while spinosad use increased 55 percent.

Table 7 shows 2006 agricultural and non-agricultural DPP cases by season.

Table 7. DPP Cases by Season of the Year, 2006

	Agricultural	Non-Agricultural	Total Cases
January - March	2	11	13
April – June	29	41*	70
July - September	11	37*	48
October - December	2	16	18
Total	***44***	***105***	***149***

** Includes one case with exposure occurring in 2005 and investigation completed in 2006.*

Age and Gender

In 2006, males (53) reported more occupational exposures than females (22). Females (38) and males (35) reported comparable numbers of non-occupational exposures (Table 8).

There were 17 cases involving children younger than 18 years that were determined to be definitely, probably, or possibly related to pesticide exposure. Eleven of the children were under the age of six, five were between ages six and 11, and one was a teenager. Below are case examples.

- Four had ocular symptoms from lice shampoo.
- Five were from aerosol sprays.
- Two were related to flea treatments.
- One accidentally ingested an herbicide.

- One accidentally ingested an ant killer.
- One intentionally ingested slug bait.
- One child thought that insecticide was mosquito repellent.
- One teenager had a flea fogger accidentally discharge in her face.

Table 8 lists the age and gender of 2006 DPP occupational and non-occupational cases.

Table 8. Occupational and Non-Occupational DPP Cases by Age and Gender, 2006

	Occupational		Non-Occupational		
Age	**Female**	**Male**	**Female**	**Male**	**Total**
0-5			5	6	11
6-11				5	5
12-18		1	1		2
19-29	4	11	4	2	21
30-49	9	33	9	8	59
50+	9	8	19	14	50
Total	***22***	***53***	***38***	***35***	***148****

** Not included is a male in the 12-18 age range where occupational status of exposure is unknown.*

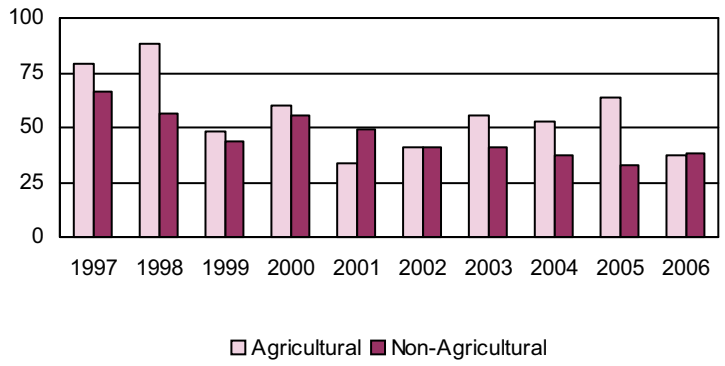
Occupational Cases of Pesticide-Related Illness

In 2006, 108 (43%) of all reported cases investigated by DOH involved a pesticide exposure on the job. Of these, 75 (69%) were classified as definite, probable, or possible cases compared to 98 (73%) in 2005.

Thirty-seven of the 75 DPP cases were agricultural workers, and 38 were from other occupations. Figure 6 shows DOH agricultural and non-agricultural occupational cases for the years 1997 through 2006.

Although the number of agricultural DPP cases has increased since 2001, cases overall are lower than what was reported in the mid-1990s. Changes in reporting and investigation procedures may have contributed to this change. The lowest number of agricultural DPP cases occurred in 2001. Since then, there has been a gradual increase in cases peaking in 2005 when five drift events resulted in a greater number of cases compared to prior years (Table 9). In 2006, a decline in the number of agricultural cases classified as DPP occurred. This finding may be a result of Pesticide Program understaffing during 2006, described previously.

Figure 6. Agricultural and Non-Agricultural Occupational DPP Cases, 1997 – 2006



Agricultural Pesticide Events

The annual number of drift cases tends to be variable since a single event can affect multiple people. Drift to workers generally involves agricultural workers. Drift to non-workers generally involves people in their homes, driving on roads, or in parks. Table 9 shows the numbers of occupational and non-occupational drift cases for 2001 through 2006.

Table 9. Agricultural Drift to Workers and Others, 2001 – 2006

Year	Occupational	Non-occupational	Total Drift Cases
2001	14	13	27
2002	16	30	46
2003	12	12	24
2004	5	11	16
2005	20	10	30
2006	9	7	16
Total Cases	***76***	***83***	***159***

In 2006, DOH investigated 91 reports of suspected pesticide-related illness involving agricultural operations. These exposures occurred when the pesticide application was intended for agricultural commodities such as fruit and field crops, nursery, livestock, and forest operations. Of the 91 cases, DOH classified 44 as definite (3), probable (16), and possible (25). An additional 18 cases were classified as having insufficient information. In 2006, there were more drift exposures than any other single type of exposure (Table 10). This finding also occurred in 2004 and 2005 and indicates that pesticide drift is a continuing problem.

Table 10. Agricultural Occupational and Non-Occupational DPP Cases by Source, 2006

Source of Pesticide Exposure	Occupational	Non-Occupational	Total
Drift	9	7	16
Direct spray/dust during application*	12	0	12
Leak/Spill	6	0	6
Other	3	0	3
Unknown	3	0	3
Indoor Air	2	0	2
Surface/foliar residues	2	0	2
Total Cases	***37***	***7***	***44***

**Can be direct exposure to the handler or overspray to a bystander. Includes exposure to fumes while mixing or loading.*

Pesticides Involved in DPP Cases with Agricultural Workers

In 2006, there were 37 workers with illness/injury classified as definitely, probably, or possibly related to pesticide exposure during agricultural occupational activities. Twenty-six of the 37 agricultural workers were handling pesticides at the time of their exposure. Handling is defined as applying, mixing/loading, transporting pesticides, or maintaining pesticide equipment. Eleven workers were exposed to pesticide drift or residues on leaves while thinning, pruning, handling nursery plants, or doing other agricultural work.

As in prior years, insecticides continue to be the most problematic class of pesticide in terms of reported illnesses and injuries in Washington agriculture. Fifteen (41%) of the 37 DPP cases among agricultural workers involved exposure to insecticides either alone or in combination with other pesticides.

Fungicides were involved in eight of the 37 exposures, although the majority of these were from fungicides in tank mixes with insecticides. This reflects the common practice of tank mixing insecticides and fungicides in tree fruit applications. Herbicides were involved in eight of the 37 cases.

Cholinesterase inhibiting insecticides are the class of pesticides most associated with illness reports. Ten (67%) of the 15 DPP insecticide cases in agricultural workers involved a cholinesterase inhibitor. However, there are three factors which appear to be decreasing the number of cases associated with cholinesterase inhibiting insecticides over time: required phase-out of certain cholinesterase inhibitors by the Environmental Protection Agency, improvements in worker safety provided by the cholinesterase monitoring program, and increased use of alternatives to cholinesterase inhibitors.

Table 11 shows the pesticide active ingredients for DPP cases involving agricultural workers. Since pesticides are commonly tank-mixed with other active ingredients, the number of total cases involving exposure to a specific chemical is often higher than indicated in the table.

Table 11. DPP Cases Involving Agricultural Workers by Pesticide Ingredient, 2006

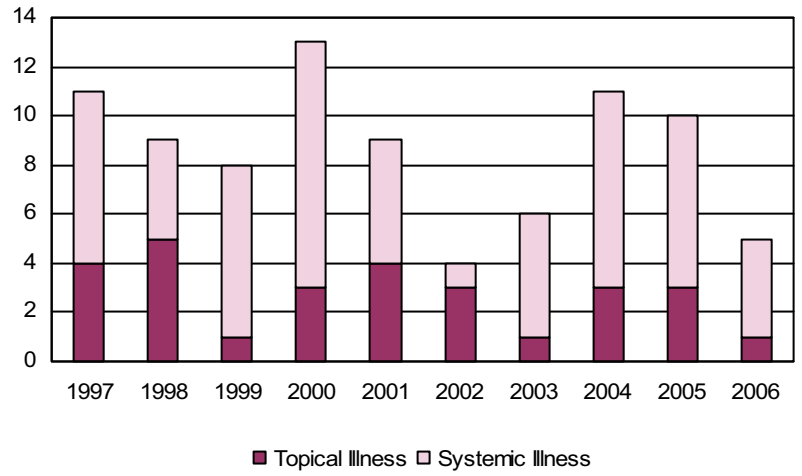
Pesticide	Handlers	Other Workers
Cholinesterase Inhibitors		
Dimethoate (ANSI)	1	
Carbaryl		1
Chlorpyrifos	1	
Combination of cholinesterase inhibitors with other pesticides	3	4
Other insecticides		
Combinations of insecticides and other pesticides (no cholinesterase inhibitors)	4	1
Herbicides		
Glyphosate (mostly as Roundup)	3	
Paraquat dichloride	2	1
Herbicide combinations	1	1
Fungicides		
Calcium polysulfide (lime sulfur)	2	
Chlorothalanil	1	
Sulfur	1	
Triadimefon	1	
Combinations of fungicides	1	2
Other		
Disinfectant	1	
Fenpyroximate	1	
Kaolin	1	
Prohexadione calcium	1	
Safer Soap	1	
Spinosad		1
Totals	***26***	***11***

Cholinesterase-Inhibiting Insecticides

With the statewide implementation of cholinesterase monitoring by L&I in 2004, there is continued interest in data specific to cholinesterase inhibiting insecticides. In 2006, DOH documented five DPP cases in pesticide handlers associated with cholinesterase inhibitors. This is about half of what was documented in 2005. DOH has seen an average of about ten cases annually among handlers for the last ten years. Overall, cholinesterase inhibitors were associated with about one-third of DPP handler pesticide cases in 2004 and 2005.

Figure 7 shows the number of handlers that experienced systemic symptoms (which affects the body internally) and the number that had topical symptoms (which affects the body externally) from 1997 to 2006. In 2006, four handlers had systemic symptoms and one had topical symptoms.

Figure 7. Type of Illness and Injury for Handlers of Cholinesterase-Inhibiting Pesticides,* 1997 – 2006



**Agricultural workers who handle cholinesterase inhibitors via mixing, loading, applying, or repairing equipment.*

Crops Associated with DPP Cases for all Agricultural Pesticides

Table 12 shows the crop associated with the 44 DPP cases resulting from agricultural pesticide use in 2006. The crops involved were fruit (30) and field or vegetable (8). The remaining six exposures were from other agricultural targets.

In 2006, as in past years, the leading crops associated with reported cases are tree fruit, one of the primary agricultural sectors of the state economy. These are labor-intensive crops requiring workers to be thinning, pruning, or harvesting during the same times of year that pesticides are applied. Dense planting of trees impedes the applicator's line of sight and requires communication with farm foremen and with neighboring farms to keep all workers clear of pesticide applications. The airblast sprayer is commonly pulled by a tractor that has no enclosed cab, as it does not fit well between the rows of trees. This leaves drivers of airblast sprayers relatively exposed to the high pressure spray and reliant on personal protective equipment to protect them from contact with spray. The high pressure spray is also prone to drift.

Table 12. DPP Agricultural Cases by Target and Activity, 2006

Crop	Handlers		Other Workers	Bystanders		Total
	Applying	Mix/Load /Repair	Routine Work	Exposed while Outdoor	Exposed while Indoor	Total
Fruit						
Apples	9	6	9			24
Cherries	1		1	1		3
Pears				1		1
Grapes	1					1
Strawberries	1					1
Field and Vegetable Crops						
Lentils				1		1
Peas	1				2	3
Mint				2		2
Wheat			1			1
Miscellaneous Vegetable	1					1
Other Agricultural						
Ornamental nurseries	2	1				3
No applicable target		3				3
Totals	***16***	***10***	***11***	***5***	***2***	***44***

Non-Agricultural Pesticide Events

Of the 254 cases investigated in 2006, 153 were associated with non-agricultural pesticide use. DOH determined 105 (68%) of these to be definitely, probably, or possibly related to pesticide exposure (Table 13). Non-agricultural events include pesticide misapplications or spills that occur at homes, commercial buildings, industrial sites, or from roadside spraying. Of the 105 DPP non-agricultural exposures, 75 (71%) were at a residential site at the time of their exposure. Thirty-eight (36%) of the individuals were working at the time of exposure and 67 (64%) were not at work.

Table 13. Exposure Site for Non-Agricultural, Occupational and Non-Occupational DPP Cases, 2006

Exposure Site	Occupational	Non-Occupational
Residential building or grounds (home, apartment)	9	66
Other residential institution	1	
Industrial facility	4	
Office, retail or service businesses	16	
Park, lake, camp grounds	1	
Road, right-of-way or vehicle	3	
School, prison, hospital/clinic	4	
Other		1
Total non-agricultural pesticide use	***38***	***67***

Non-Agricultural Non-Occupational

In 2006, of the 38 non-agricultural cases that occurred on-the-job; 26 were males and 12 were females. The 26 males were handling pesticides at the time of exposure. None of the females were handling pesticides.

Non-Agricultural Non-Occupational Exposures by Applicator Type

In 2006, nine of the 67 non-agricultural, non-occupational DPP cases were exposed to applications by professional (paid) applicators (Table 14).

The remaining 58 exposures were due to applications made by home owners, landlords, and coworkers. Specifically, these involved pesticide treatments of:

- Outdoor insects/slugs (2).
- Insects in or around the home (14).
- Treatments to people or pets for lice or fleas (9).
- Deer, raccoon, or rodent (3).
- Herbicides/treatments for moss or weeds (16).
- Accidental ingestion or release of pesticide products (14).

Table 14. Target Pest for Non-Agricultural, Non-Occupational Cases Exposed to Pesticide Applications by Professional* and Non-Professional Applicators, 2006**

	Professional Applications	Non-Professional Applications
Landscape/Garden Use		
Insects	1	1
Weeds	2	13
Moss in Lawn		1
Deer Repellent		1
Slugs		1
Use In/Around Structures		
Insects/Spiders	5	14
Raccoons		1
Rodents		1
Moss on Roof		2
Applications to People/Pets		
Lice/Scabies Treatments		7
Fleas on Pets		2
Aquatic (fish eradication)	1	
Accidental/Non-Targeted		
Non-Targeted		13
Repellent		1
Total	***9***	***58***

* *Professional is defined as persons paid (licensed or unlicensed) to apply the pesticide.*
** *Limited to cases with illness classified by DOH as definitely, probably, or possibly due to pesticide exposure.*

Conclusions and Recommendations

Although the number of cases DOH classified as Definite, Probable, or Possible declined in 2006 when compared to 2005 (149 versus 188 DPP cases, respectively), this finding is likely due to the increase in insufficient information classifications for 2006 (22% from an average of 17%). The DOH Pesticide Program was understaffed in 2006. Understaffing impacts the Program's ability to identify the pesticide involved in an illness and to characterize the exposure details. Understaffing also makes it difficult to obtain medical and spray records in a timely fashion. As the Pesticide Program was fully staffed for the majority of 2007, DOH will attempt to determine if the number of DPP cases remains on the decline for 2007. DOH will also explore the reasons for classifying cases as "insufficient" over a multi-year period and include a description of the findings in next year's report.

DOH data consistently show that most pesticide illness cases occur seasonally, during the period of April through September. As in prior years, drift continues to be the number one source of pesticide illness in agriculture. Cholinesterase

inhibiting insecticides continue to be the class of pesticide most highly associated with DPP cases. DOH continues to study the mechanisms and risks associated with drift exposures through the drift checklist project in conjunction with NIOSH and through the drift air monitoring study funded by the Washington State Legislature 2007-2009 budget. DOH will complete these studies, evaluate resulting data, and provide policy recommendations in future reports. DOH is also coordinating with L&I on transitioning the cholinesterase monitoring database system to the Division of Occupational Safety and Health while maintaining data quality and access for the Pesticide Program.

Since 2000, the number of non-agricultural DPP cases has increased as a percentage of the total and most of these cases are associated with non-occupational use around residential buildings and grounds. DOH staff shall continue to explore these trends to determine potential causal factors.

As in prior years, most individuals who experienced a pesticide related illness suffered mild symptoms. A smaller percentage (15%) of the exposures produced moderate or severe medical outcome, including one death. However, even mild symptoms may cause distress and other problems, including loss of work time.

This preliminary report on DOH data will be followed with a final report that will include sections from all state agencies on their respective pesticide programs. DOH will more fully discuss findings from the 2006 data in the final PIRT report scheduled for completion in mid-2008.

Appendix A – Case and Severity Classifications

National Public Surveillance System Relationship Classifications

NIOSH Severity Classifications

Signs and Symptoms by Severity Category

National Public Surveillance System Relationship Classifications

Definite Case: 1. Laboratory clinical or environmental evidence corroborates exposure, 2. Two or more new post-exposure abnormal signs and/or test/laboratory findings are reported by a licensed health care provider, and 3. The finding documented under health effects are characteristic for the pesticide and the temporal relationship between the exposure and health effects is plausible and/or the findings are consistent with an exposure-health effect relationship based upon the known toxicology of the putative agent.

Probable Case: 1. Laboratory clinical or environmental evidence corroborates exposure, 2. Two or more post-exposure abnormal symptoms reported but do not meet the threshold of a definite, and 3. The finding documented under health effects are characteristic for the pesticide and the temporal relationship between the exposure and health effects is plausible and/or the findings are consistent with an exposure-health effect relationship based upon the known toxicology of the putative agent.

Or

1. Evidence of exposure based solely upon written or verbal report by case, witness, application, observation of residue and/or contamination by other than a trained profession or other evidence suggesting that an exposure occurred, 2. Two or more new post-exposure abnormal signs and/or test/laboratory findings are reported by a licensed health care provider, and 3. The finding documented under health effects are characteristic for the pesticide and the temporal relationship between the exposure and health effects is plausible and/or the findings are consistent with an exposure-health effect relationship based upon the known toxicology of the putative agent.

Possible Case: 1. Evidence of exposure based solely upon written or verbal report by case, witness, application, observation of residue and/or contamination by other than a trained profession or other evidence suggesting that an exposure occurred, 2. Two or more post-exposure abnormal symptoms reported but do not meet the threshold of a definite, and 3. The finding documented under health effects are characteristic for the pesticide and the temporal relationship between the exposure and health effects is plausible and/or the findings are consistent with an exposure-health effect.

Suspicious Case: 1. Laboratory clinical or environmental evidence corroborates exposure, or evidence of exposure based solely upon written or verbal report by case, witness, application, observation of residue and/or contamination by other than a trained profession or other evidence suggesting that an exposure occurred, 2. Two or more new post-exposure abnormal signs and/or test/laboratory findings are reported by a licensed health care provider or two or more post-exposure abnormal symptoms reported but do not meet the threshold

of a DEFINITE, and 3. Insufficient toxicological information is available to determine causal the relationship between the exposure and health effects.

Unlikely Case: 1. Laboratory clinical or environmental evidence corroborates exposure, or evidence of exposure based solely upon written or verbal report by case, witness, application, observation of residue and/or contamination by other than a trained profession or other evidence suggesting that an exposure occurred, 2. Two or more new post-exposure abnormal signs and/or test/laboratory findings are reported by a licensed health care provider or two or more post-exposure abnormal symptoms reported but do not meet the threshold of a DEFINITE, and 3. Evidence of exposure-health effect relationship is not present due to no observed health or effect, a temporal relationship does not exist, or the constellation of health effects are not consistent based upon the known toxicology of the putative agent.

Insufficient Information: Insufficient data in the documentation of the pesticide exposure or insufficient data in the documentation of adverse health effects.

Not a Case: Strong evidence that no pesticide exposure occurred or insufficient toxicological information is available to determine causal relationship between exposure and health effects.

NIOSH Severity Classifications

Severity Index for Use in State-based Surveillance of Acute Pesticide-related Illness and Injury Descriptions of Severity Categories

01 Mild illness or injury: Low severity. Often involves skin, eye or upper respiratory irritation. May also include fever, headache, fatigue or dizziness. Typically the illness or injury resolves without treatment. There is minimal lost time (less than 3 days) from work or normal activities.

02 Moderate illness or injury: This category often involves systemic manifestations. Usually treatment is provided. The individual is able to return to normal functioning without any residual disability. Usually, less time is lost from work or normal activities (3-5 days) compared to those with severe illness or injury. No residual impairment is present although effects may be persistent.

03 Severe illness or injury: Considered life threatening and typically requires treatment. Commonly involves hospitalization to prevent death. Signs and symptoms include, but are not limited to, coma, cardiac arrest, renal failure and/or respiratory depression. The individual sustains substantial loss of time (more than 5 days) from regular work. Can include assignment to limited or light work duties or normal activities if not employed. This level may include the need for continued health care after the exposure, prolonged time off of work, and limitations or modification of work or normal activities. The individual may sustain permanent functional impairment.

04 Death: Includes a human fatality resulting from exposures to one or more pesticides.

Signs and Symptoms by Severity Category

Table: Signs and symptoms by severity category (Modeled after Persson et. al., 1998 and includes SPIDER database elements)

ORGAN SYSTEM	SEVERITY CATEGORY AND CODE			
	FATAL	HIGH	MODERATE	LOW
	1	2	3	4
	Death	**Severe or Life-threatening Signs**	**Pronounced or Prolonged Signs or Symptoms**	**Mild, transient, and spontaneously resolving symptoms**
• Gastrointestinal • System		• Massive hemorrhage/perforation of gut	• Diarrhea (G14, **sign only**) • Melena (GI7) • Vomiting (GI6, **sign only**)	• Abdominal pain, cramping (GI1) • Anorexia (GI2) • Constipation (GI3) • Diarrhea (GI4, **symptom**) • Nausea (GI5) • Vomiting (GI6, **symptom**)
Respiratory System		• Cyanosis (RESP 2) + Respiratory depression (RESP 7) • Pulmonary edema (RESP6) • Respiratory arrest	• Abnormal pulmonary x-ray • Pleuritic chest pain/pain on deep breathing (RESP8) • Respiratory depression (RESP7) • Wheezing (RESP9) • Dyspnea, shortness of breath (RESP4, **sign only**)	• Cough (RESP1) • Upper respiratory pain, irritation (RESP3) • Dyspnea, shortness of breath (RESP4, **symptom**)
Nervous System		• Coma (NS3) • Paralysis, generalized (NS10) • Seizure (NS5, **sign only**)	• Confusion (NS4) • Hallucinations (NS99 Other) • Miosis with blurred vision (NS14) • Seizure (NS5, **symptom**) • Ataxia (NS1, **sign only**) • Slurred speech (NS12) • Syncope (fainting) (NS17) • Peripheral neuropathy (NS11, **sign only**)	• Hyperactivity (NS2) • Headache (NS7) • Profuse sweating (NS13) • Dizziness (NS15) • Ataxia (NS1, **symptom**) • Peripheral neuropathy (NS11, **symptom**)

ORGAN SYSTEM	SEVERITY CATEGORY AND CODE			
	FATAL	HIGH	MODERATE	LOW
	1	2	3	4
	Death	**Severe or Life-threatening Signs**	**Pronounced or Prolonged Signs or Symptoms**	**Mild, transient, and spontaneously resolving symptoms**
Cardiovascular System		• Bradycardia/ heart rate <40 for adults, < 60 infants and children, <80 neonates (CV1) • Tachycardia/ heart rate>180 for adults, >190 infants/children, >200 in neonates (CV4) • Cardiac arrest (CV2)	• Bradycardia / heart rate 40-50 in adults, 60-80 in infants/children, 80-90 in neonates (CV1) • Tachycardia / heart rate=140-180 in adults, 160-190 infants/children, 160-200 in neonates (CV4) • Chest Pain (CV7) + Hyperventilation, Tachypnea (RESP5) • Conduction disturbance (CV3) • Hypertension (CV6) • Hypotension (CV5)	
Metabolism		• Acid Base disturbance (pH< 7.15 or >7.7)	• Acid Base disturbance (pH = 7.15-7.24 or 7.60-7.69) • Elevated anion gap (MISC4)	• Fever (MISC1)
Renal System		• Anuria (GU2) • Renal failure	• Hematuria (GU3) • Oliguria (GU2) • Proteinuria (GU4)	• Polyuria (GU1)
Muscular system		• Muscle rigidity (NS9) + elevated urinary myoglobin + elevated creatinine	• Fasciculations (NS6) • Muscle rigidity (NS9) • Muscle weakness (NS8, **sign only**)	• Muscle weakness (NS8, **symptom**) • Muscle pain (NS16)
Local effects on skin		• Burns, second degree (involving >50% of body surface area) • Burns, third degree (involving >2% of body surface area)	• Bullae (DERM1) • Burns, second degree (involving <50% of body surface area) • Burns, third degree (involving <2% of body surface area)	• Skin Edema/Swelling, Erythema, Rash, Irritation/Pain, Pruritis (DERM3 - 7) • Hives/Urticaria
Local effects on eye		• Corneal ulcer/perforation	• Corneal abrasion (EYE3) • *Ocular burn (EYE2)*	• Lacrimation (EYE4) • Mydriasis (EYE6) • Miosis (EYE1) • Ocular pain/irritation/inflammation (diagnosis of conjunctivitis) (EYE5)
Other effects				• Fatigue (MISC5) • Malaise (MISC6)