Aerial Pesticide Application and Drift Impacting an Elementary School – Florida 2011

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Florida Department of Health

CSTE Annual Conference
June 5, 2012
March 31, 2011 at 07:45 AM - Aerial application to corn field near an elementary school

Students and school staff – noticed an odor and complained of eye & skin irritation

Principal - immediately locks down school

Teachers washed the children’s hands and faces

Agencies responded: Fire Department, Palm Beach County School Board, PBCHD, FDOH, FDACS
Gove Elementary School
Belle Glade, Florida
Incident Information

- Children and teachers potentially exposed to
  - Insecticide - Mustang Max Insecticide (Zeta-cypermethrin)
  - Fungicide - Penncozeb® 75DF (mancozeb, naphthalene as a carrier agent)
  - Fertilizer - Nortrace Blackjack (Ammonium Zinc Blend)

- MSDS sheets obtained and reviewed
1\textsuperscript{st} conference call at 10:30AM – FDOH Toxicologist, Epidemiologists, Communication Staff; FDACS- Bureau of Pesticide; PBCHD

Palm Beach County School District was called to gather additional information

Students released at 11:30AM (early release day) after exit route washed down

Parents given notice explaining the incidence and advice on precautions
Response From The School District of Palm Beach County

- 15 School District Staff Members Cleaned Entire School
- Task took 12 hours
- Building Walls, Walkways, Overhangs, Windows Washed
- Floor Mats and Floors Thoroughly Washed
- A/C Filters Were Changed
- All Desktop Surfaces Were Cleaned
- Buses Delivering Children to this School Were also Washed
FDOH & FDACS Response

- FDACS provides Q&A document to school on April 7th, 2011 (FDOH provided consultation)
- FDOH & PBCHD conducted epidemiological investigation
- FDACS compliance investigation conducted
Epidemiological Investigation

- Investigation coordinated with PBCHD and CDSP*
- Pesticide-related illness and injuries are reportable in Florida
- Local physicians and other health care providers contacted to gather suspected case related to drift incidence at Gove elementary school
- Searched Florida Poison Information Center & Emergency Department chief complaint data for additional reports
- All potential reports were matched and only unique results were analyzed

* CDSP – Chemical Disease Surveillance Program
PBCHD administered a survey and gathered information on symptomatic school staff and student.

Standard questionnaire was administered to symptomatic staff and parents of ill children.

Questionnaire includes demographic, exposure and symptom information.
GOVE ELEMENTARY SCHOOL TEACHER/STAFF QUESTIONNAIRE

Please complete this form and return to the Palm Beach County Health Department, Epidemiology Division fax # 561-837-0330 by Friday April 8, 2011. This will help us in our investigation of the effects of the chemical exposure that occurred on March 31. Please call the Epidemiology Program at 561-671-4104 if you have any questions. Thank you very much.

Name: First ___________________ Last ___________________ Date of Birth ____________
Street address _____________________ City ___________________ Zip ____________ Telephone #: _____________________
Sex: Male ___________________ Female ___________________
Race/Ethnicity: White Hispanic Asian Black Native American Other ____________
Estimated Duration of Exposure ____________
Time of Exposure ____________
Activities involved in during time of exposure ____________
Date of illness onset ____________ Duration of symptoms _____________________
Signs/symptoms (Check all that apply)
Abdominal Pain ____________ Eye Irritation ____________ Diarrhea ____________ Rash ____________ Repellents ____________
Weight Gain ____________ Fatigue ____________ Headache ____________ Wheezing ____________
Congestive ____________ Chest Pains ____________ Retching ____________ Imiting ____________
Nausea ____________ Difficulty Breathing ____________ Irregular Heart Beat ____________
Altered Taste ____________ Vomiting ____________ Sweating ____________ Salivation ____________
Others: ___________________

Was medical care received? Yes ____________ No ____________
If yes, what type? MD Visit ____________ ER Visit ____________ Hospitalized ____________
Name of physician: ___________________
If hospitalized, name of medical facility: ___________________
Date of admission: Diagnosis (if available): ___________________
Are there any preexisting conditions? Yes ____________ No ____________
If yes, type of preexisting condition: ___________________

Palm Beach County Health Department
Division of Epidemiology & Disease Control
200 Clemont Street, 5th Floor, West Palm Beach, Florida 33401
Phone: (561) 837-4101 • Fax: (561) 837-7335 • http://www.pbchd.com
Investigation Findings

- 813 students & 85 staff involved
- 67 symptomatic individuals completed survey-
  - 22 students & 45 staff
- Age in years - students (5 to 14); staff (25 to 65)
- Average age- 34.67 years
- Females = 56 (83.6%)
Findings Cont.

- White = 43 (64.2%); Black = 18 (26.9%); Asian = 2 (3%); Unknown = 4 (6%); Hispanic = 26 (38.8%)

- Type of medical care received - seen by nurse (school & other) = 52 (77.6%); physician = 11 (16.4%); Emergency Department = 4 (6%)

- 57 individuals reported 2 or more symptoms
## Symptoms (N=67*)

<table>
<thead>
<tr>
<th>Health Effects</th>
<th>#</th>
<th>% of N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye (irritation, lacrimation, blurred vision)</td>
<td>37</td>
<td>55.2</td>
</tr>
<tr>
<td>Dermal (rash, pruritus, redness)</td>
<td>27</td>
<td>40.3</td>
</tr>
<tr>
<td>Respiratory (throat irritation, dyspnea, coughing, wheezing, nose bleeding, sneezing)</td>
<td>36</td>
<td>53.7</td>
</tr>
<tr>
<td>GI (nausea, vomiting, abdominal pain, lip burning, altered taste)</td>
<td>34</td>
<td>50.7</td>
</tr>
<tr>
<td>Neurological (headache, dizziness, fatigue, sweating)</td>
<td>38</td>
<td>56.7</td>
</tr>
<tr>
<td>Cardiac (chest pain, high BP, irregular heart beat)</td>
<td>12</td>
<td>17.9</td>
</tr>
</tbody>
</table>

* The number add up to more than 67 (the number of symptomatic individuals) and percentages are greater than 100 as 54 individuals reported multiple symptoms involving different organ systems (e.g. eye and respiratory)
Findings Cont.

- 50 patients reported on the duration of their illness
- Symptoms duration- 15 minutes to 4 days (mean 30.27 hours and median 24 hours)
- Ten (15%) reported to have pre-existing conditions - asthma (8), heart disease (1) and high blood pressure (1)
Classification - Severity of Illness

- **Fatal**: death due to illness/injury
- **High**: more than 72 hrs hospital stay/ > 5 days of lost time/ life threatening illness/ permanent functional impairment
- **Moderate**: > 24 hrs hospital stay/ ≥3-5 days lost time/ less severe symptoms often systemic manifestation/ no disability
- **Low**: no hospital stay/no lost time/ local health effects
Pesticide Poisoning Cases

- Out of 67 symptomatic individuals 57 matched case definition*
- Cases by severity of illness** - low severity (27); moderate severity (30)

*FDOH’s case definition for pesticide poisoning is adopted from NIOSH and requires two or more related symptoms

**Individuals with dyspnea, wheezing, chest pain, irregular heart beat, high blood pressure, vomiting and nose bleeding were considered as having moderate severity illness while other symptoms were categorized as low severity of illness
### Time Spent Inside/Outside the School by Severity of Illness (n=59*)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Low Severity (n=25)</th>
<th>Moderate Severity (n=20)</th>
<th>Low Severity (n=22)</th>
<th>Moderate Severity (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. Time</td>
<td>5</td>
<td>3</td>
<td>311</td>
<td>243</td>
</tr>
<tr>
<td>Max. Time</td>
<td>90</td>
<td>480</td>
<td>300</td>
<td>240</td>
</tr>
<tr>
<td>Mean</td>
<td>14</td>
<td>48</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>Median</td>
<td>5</td>
<td>13</td>
<td>480</td>
<td>420</td>
</tr>
</tbody>
</table>

* The numbers add up to more than 59 as 19 individuals reported time spent both inside and outside the school.
Results of Statistical Test

- The severity of illness was significantly associated with age group, reported pre-existing condition or type of medical care received (Fisher’s test, \( p<0.05 \))
- Severity of illness was not significantly associated with race, ethnicity or gender
- While the study shows that people with moderate severity were outside the school for longer time (mean - 50 minutes) as compared to those with low severity (mean - 14 min), this factor was not statistically significant
Florida Department of Agricultural & Consumer Services (FDACS)

FDACS Investigation Results:
- School officials, grower and aerial applicator interviewed
- Samples and other evidence collected
- Other aerial applicators in area interviewed

Findings
- No violations identified
- Letter of findings sent June 22, 2011

* Ref - Dr. Dennis Howard – Pesticide Review Council – August 30, 2011
Discussion

- Health effects of pesticide exposure - irritation of skin and eyes; low to moderate oral and inhalational toxicity
- Inhalation of aromatic hydrocarbon (e.g. naphthalene) vapors can cause dizziness in addition to eye, skin and respiratory irritation
- Consistent with majority of the reported health effects (skin, eye and respiratory irritation)
- The neurological and cardiac effects may be due to the presence of pre-existing conditions (e.g. high BP) or due to indirect effects of pesticide exposure (e.g. panic and stress)
Conclusion

- The health effects following the drift incident at the elementary school are consistent with the pesticide used (MSDS – Toxicological Information).
- Of all staff at the school (N=85), half experienced health effects (N=45) regardless of whether they were outdoors or indoors during the event.
- Individuals with pre-existing conditions were more likely to experience moderate rather than low severity of illness.
- Individuals with moderate versus low severity of illness were more likely to receive medical care.
Recommendations

- Review policies regarding pesticide application around schools e.g. buffer zone around school
- Identify best practices to prevent pesticide drifts e.g. ‘The Good Neighbor Practices’ program developed by University of Florida
- Educate and encourage implementation of best practices to prevent drift
- Investigate all drift incidents and identify gaps in current practices to develop prevention messages
Acknowledgements

- **FDOH**
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