Contributors

- Department of Pesticide Regulation (DPR)
  - Shafeesha Ali
  - Lucia Graham, Ph.D, REHS
  - Yvette Nonato, MD, DPBRM
  - Lisa Ross, Ph.D.

- Office of Environmental Health Hazard Assessment (OEHHA)
  - Ouahiba Laribi, Ph.D, MPH
  - William Ngai, MD, MPH
Why monitor cholinesterase levels?

Mode of action of OPs and CBs on ChE and nerve signal transmission. (Modified from http://depts.washington.edu/opchild/acute.html.)
3CCR §6728 and HSC §105206
3CCR §6728 and HSC §105206

- Laboratories
  - Must be approved by CDPH.
  - Perform ChE analysis as prescribed in 3CCR §6728.
  - Submit ChE test results with predefined data elements to DPR on monthly basis, at minimum.
2015 Legislative Report

- Overall, the Program appears effective in protecting agricultural workers handling OPs/CBs.
- Most individuals identified as part of the Program did not have depressed ChE activity levels.
- Most individuals’ ChE activity levels recovered rapidly after a depression.
- Most medical supervisors who regularly ordered ChE testing were aware of their responsibilities.
- Over half of the growers surveyed were familiar with the Program but had varying levels of understanding of specific requirements.
2015 Legislative Report

• Laboratory-based reporting had some challenges –
  • Thousands of ChE tests reported – many were unrelated to the Program.
  • Reports from the laboratories still have missing or incomplete data elements, e.g., purpose of test.
  • Only 56% of medical supervisors surveyed in 2014 indicate the PURPOSE of the test.
• There was no accurate and complete list of medical supervisors.
2015 Legislative Report Recommendations

- Continue evaluating the Program and analysis of ChE test results.
- Outreach to employers, medical supervisors, laboratories, local health officers, and county agricultural commissioner staff.
- Develop a list of currently active medical supervisors.
- Promote and expand medical supervision training.
- Conduct focused headquarters inspection of Pest Control Operators similar to those conducted with growers.
- Provide an update to the Secretary of CalEPA by December 2017.
Since 2015 Legislative Report

  - Specific terminology for purpose of the test.
  - OEHHA developed a procedure for registering and deregistering medical supervisors.
  - Employers to contract with only physicians registered with OEHHA.
  - Continued reporting of ChE test result until January 1, 2021.
- DPR updated 3CCR §6728 to reference HSC §105206.
- Developed outreach material for employers, medical supervisors, CACs and general public.
2018 Update on ChE Test Results Reporting

• DPR continues to receive test results from specimens drawn throughout the state.
  • Thousands of ChE tests reported – many unrelated to the Program.
  • Reports from the laboratories still have missing or incomplete data elements, e.g., purpose of test.

• The update report characterized the quality of the ChE test results and ChE depressions were not calculated.
ChE Test Results 2011-2017

• 91,093 ChE test results‡ (2011-2013) from 6 laboratories
  • 41,911 test orders
• 102,378 ChE test results (2014-2017) from 7* laboratories
  • 49,014 test orders

Figure 1: Yearly number of ChE test results received by DPR from the reporting laboratories between 2011 and 2017. † - The increase in ChE test results from PALI in 2016 and 2017 were due to laboratory submitting 5 different assay results, instead of 2, per specimen sample. * - Number of ChE tests ordered by health care providers as reported by the laboratories.

‡ 3CCR§6728: Red blood cell and plasma ChE determination. Several labs submit results for additional ChE analysis.
* LabCorp added to CDPH approved list of to analyze ChE in 2016.
Purpose of test

- HSC§105206 requires purpose of ChE test
  - Large proportion of test results do not include this information.
- Slight increase in number of test results with purpose.
  - 10.9% in 2011-2013 to 16.7% in 2014-2017
Physicians Reporting under the Program

- Physicians renew registration annually.
- https://oehha.ca.gov/pesticides/general-info/medical-supervisor-registration
Physicians Reporting under the Program

• As of February 26, 2018
  • 88 physicians registered as Medical Supervisors.
  • 81 other health care providers working under the supervision of medical supervisor.

Figure 3: Geographic distribution of registered medical supervisors.
ChE Test Ordered by Medical Supervisor

- From 2011-2013, 24.8% (10,375) of all ChE tests were ordered by medical supervisors.
  - 15.8% indicated purpose
- From 2014-2017, 36.8% (18,058) of all ChE tests were ordered by medical supervisors.
  - 29.6% indicated purpose

Figure 4: Number of ChE tests ordered by medical supervisors and purpose of test as indicated in the reports submitted by laboratories from 2011 to 2017. Physicians identified as medical supervisor by DPR in 2014, OEHHA’s outreach project in 2015 or physicians registered as medical supervisor with OEHHA (as of February 26, 2018).
Summary

- Slight increase in number of ChE test results with purpose in 2014-2017 as compared to 2011-2013.
- 2-fold increase in number of ChE tests ordered by medical supervisors.
- Data quality and quantity still needs improvement.
Next Steps

- DPR continuing its compliance inspection and survey of pest control businesses
- OEHHA initiated rulemaking to establish in regulation the procedure for registration and deregistration of medical supervisors.
- Continue outreach to medical supervisors, employers, CACs and the general public.
- Complete report on the effectiveness and utility of ChE result reporting will be prepared and publically posted by January 1, 2021
Medical Supervisor Compliance Information

What employers need to know to comply with 3 CCR 6728

EMPLOYER RESPONSIBILITIES UNDER THE MEDICAL SUPERVISION PROGRAM

What is the Medical Supervision Program?
California’s medical supervision program is required to protect agricultural workers who mix, load, or apply organophosphate or N-methyl carbamate pesticides with the signal word "DANGER" or "WARNING" on the label. If the employee works with such pesticides for more than six days in a consecutive 30-day period, blood levels of an important enzyme called cholinesterase must be monitored by a physician. If cholinesterase drops below certain levels, employees are required to take specific actions to prevent employee illness and injury.

What is cholinesterase and why monitor it?
Cholinesterase is important for normal function of the nervous system. Exposure to certain pesticides can inhibit this enzyme and cause illness. Common signs of overexposure include slow heart rate, difficulty breathing, salivation, tearing, sweating, abdominal pain, diarrhea, and confusion. Sometimes exposed individuals show no signs of illness. Monitoring serves to identify depression in cholinesterase levels before an illness occurs.

How do I know which pesticides to look for?
Look for pesticides used to produce an agricultural commodity containing organophosphates or N-methyl carbamates with the signal word "DANGER" or "WARNING." Employers can identify these pesticides by looking at the "Precautionary Statements" and the "First Aid" sections on the product label.

When do I need an agreement with a physician?
You must have a physician monitor blood cholinesterase levels of employees who:
- mix, load, or apply pesticides described here;
- regularly handle such pesticides for more than six days in a consecutive 30-day period.

How do I find a physician to provide medical supervision?
Physicians must be registered with California’s Office of Environmental Health Hazard Assessment to provide medical supervision. For a list of registered physicians, see: [link].

How do I ensure my employees have a medical supervisor?
Employers must have a written agreement with a registered physician that:
- states the names and addresses of both the physician and the employer responsible for the employees;
- states the physician will provide medical supervision;
- states the physician is aware of and possesses a copy of the document "Medical Supervision of Pesticide Worker - Guidelines for Physicians" (available from the Office of Environmental Health Hazard Assessment website: goo.gl/1Ml4Wq) and is signed by the physician.

This agreement must be filed by the employer with the county agricultural commissioner.

How often should my covered employees get blood cholinesterase levels tested?
Employees must get a baseline level established for both red blood cell cholinesterase and plasma cholinesterase. These are used to compare with subsequent cholinesterase tests and must be verified every two years.

Employees must have cholinesterase tests within three working days following each 30-day period when using pesticides described above for more than six days.

After three tests at 30-day qualifying periods, further monitoring is at intervals specified by the medical supervisor. If no written recommendation is given, the testing interval shall be 60 days.

Who will inform me of the cholinesterase test results and what do I do if they decline?
Your medical supervisor will notify you if your employee’s cholinesterase test results within 14 days of receiving them. Employers are required to investigate the work practices of any employee whose red blood cells or plasma cholinesterase levels drop below 80% of baseline values. The investigation shall include review of the safety equipment used and its condition, and review of the employees sanitation, handling procedures, and equipment usage.

How if cholinesterase levels fall to 70% or less of red blood cell baseline or 60% or less of plasma baseline, an employer must remove the employee from further exposure to organophosphate or carbamate pesticides until cholinesterase levels return to 80% or more of their respective baseline values.

What records must I keep under the medical supervision program?
- pesticide use records that identify the employee, name of the pesticide, and date of use;
- the written agreement with the medical supervisor;
- all recommendations received from the medical supervisor;
- all cholinesterase test results received from the medical supervisor;
- a written record of the work place investigation findings, any changes made, and any recommendations given to the employee and:
- dates of employee removal and return to exposure, if employee is removed from exposure.

All records must be kept for three years.

ENSURE THE SAFETY OF YOUR EMPLOYEES!
Keep records detailing each day your employees handle mix, load or apply: "DANGER" or "WARNING" organophosphates or carbamates to determine if your employees "regularly handle" these pesticides.

If you have employees who "regularly handle" these pesticides:
- have their blood cholinesterase levels tested; and
- have a written agreement with a registered medical supervisor.

Communicate with the medical supervisor to obtain:
- your employees’ cholinesterase test results; and
- any occupational health recommendations.

IT’S THE LAW*
Physicians and other health care providers must report known or suspected pesticide-related illness and injury to the local health officer within 24 hours. The Office of Environmental Health Hazard Assessment is charged with providing training to physicians and other medical personnel on the recognition, treatment, and reporting of pesticide-related illness and injury.

More information: [link]
Employer Frequently Asked Questions

The medical supervisor informed me that my employee’s cholinesterase level is below 80% of baseline. What should I do? You must investigate the workplace practices, review the safety equipment, and its condition, as well as employee sanitation practices, and equipment usage. You must also maintain a written record of your findings, any changes in equipment or procedures, and any recommendations you gave your employee.

My employee’s plasma cholinesterase is 60% or less of baseline, and/or RBC cholinesterase is 70% or less of baseline, but he or she does not feel sick. Is it okay to allow the worker to continue working with these pesticides? No. You must immediately remove your employee from further exposure to the pesticides until the depressed cholinesterase level (Plasma and/or RBC) is above 80% of his or her own baseline values. Keep a written record of the dates you removed an employee from further exposure, and dates an employee is returned to handling these pesticides. You should communicate with your medical supervisor to know when this employee is cleared to handle these pesticides.

My employees have their cholinesterase levels regularly tested, and the medical supervisor is made aware of the employee’s handling schedule. Have I met all my employer responsibilities? No. You must keep the medical supervision written agreement, all pesticide use records, recommendations from the medical supervisor, employee’s cholinesterase test results and all employee records related to the program, for 3 years. You must ensure that the recommendations given by the medical supervisor, particularly, the frequency of an employee’s cholinesterase tests are followed.

For employer/employee-related questions on the Medical Supervision Program, please contact:

Pesticide Illness Surveillance Program
Department of Pesticide Regulation
P.O. Box 4015, Sacramento, CA 95812-4015
pispp@cdpr.ca.gov
(916) 445-4222

DPR’s Regional Offices:
Northern, (West Sacramento); (916) 376-8960
Central, (Chico); (530) 297-3611
Southern, (Anaheim); (714) 279-7652

What is the Medical Supervision Program? California’s medical supervision program is designed to protect the health of agricultural workers who mix, load or apply organophosphate or carbamate pesticides with signal word “Danger” or “Warning” on the label.

Who must participate in the Medical Supervision Program? Agricultural employers and their workers who handle such pesticides more than 6 days in a consecutive 30-day period participate in this program.
Questions?