Cholinesterase Testing Protocols for Healthcare Providers

Whom to Test?

Cholinesterase-inhibiting Pesticides

Test if working with Class I and Class II organophosphates (OP) or OP and N-methyl-carbamates for greater than a total of 30 hours in 30 consecutive days.

N-methyl-carbamates

If only working with N-methyl-carbamates, cholinesterase testing is not likely to be beneficial.

Baseline

Baseline Determination

Obtain baseline measures prior to working with cholinesterase-inhibiting pesticides. When obtaining the baseline, ensure that at least the previous 30 days were free of OP exposures.

Ensure that cholinesterase-inhibiting pesticides had not been handled in the immediate 30 days prior to testing.*

Establish baselines annually.

Working Baselines

Working baselines (baselines that are established when a 30–day period free of OP exposure is not possible) are likely to increase false negatives. Perform a second baseline after halting exposure (the longest practicable exposure-free period available is recommended, with a one-week exposure-free period at a minimum). If values differ by more than 10%, obtain a third baseline. The highest value should be used as the baseline.

2nd Baseline

A second baseline is recommended for improved precision but not essential. If a 2nd baseline is obtained, average the two values. When obtaining the 2nd baseline, wait to test until at least 3 days after the baseline, but within 30 days and ensure no pesticide exposures during this time period.

Testing

Test Types

Measure both acetylcholinesterase (red blood cell cholinesterase-AChE) and butyryl cholinesterase (plasma cholinesterase-PChE). AChE and PChE tests recommended; PChE if only performing 1 test.

Laboratory Services

Use the same laboratory and the same methodology for all testing so that results may be accurately compared.

Post Exposure Testing

Conduct post exposure test each time worker exceeds or reaches 30 hours of exposure within any 30–day period after the baseline or last post exposure test.

Medical Removal

Remove from handling cholinesterase-inhibiting pesticides with 30% or more reduction in cholinesterase activity (depression) of RBC or 40% or more reduction of plasma cholinesterase activity (depression).

Level to Return to Handling

Return to Handling

Return to handling when test result is greater than or equal to 80% of baseline.

Retest for Return to Work

Days to repeat test is determined by degree of reduction in cholinesterase activity.

For RBC AChE: (% depression – 20) /0.83 = # of days to repeat test

For Plasma PChE: (% depression – 20) /1.2 = # of days to repeat test

Review of Handling Practices

Review pesticide handling practices when test results are less than 80% of baseline.

** Handling of pesticides refers to tasks such as mixing, loading, transferring or applying pesticides; handling open containers of pesticides; acting as a flagger; cleaning, handling, adjusting or repairing pesticide equipment; or assisting with the application of pesticides.*

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