



# **MEDICAL EXAMS GUIDE FOR WORKERS WHO HANDLE ORGANOPHOSPHATES OR CARBAMATES**

**2017 SAN STANDARD**

**SAN-G-SP-3-V1**

## 1. INTRODUCTION

The 2017 SAN Standard requires a series of preventive controls and procedures that avoid or mitigate the health risks of workers who handle organophosphates or carbamates pesticides:

Criterion C-4.36: The farm management and group administrator test cholinesterase levels of workers who handle WHO Class II or III organophosphates or carbamates. Tests are conducted prior to the first time workers apply these substances on the farm and periodically thereafter as long as they remain assigned to this task. The farm management and group administrator offer other work that does not involve use of these chemicals to those pesticide handlers with results outside of the accepted cholinesterase levels.

In the *SAN Procedure for Exceptional Pesticide Use*, the use of certain nematicides is allowed only if the following Nematicide Risk Management Requirements are implemented:

- Annual medical monitoring of applicator health (kidney and liver function) is provided; and
- Cholinesterase levels of workers are tested, if they use the cholinesterase inhibitors cadusafos, ethoprop, fenamiphos, oxamyl and terbufos. Tests are conducted prior to the first time workers apply these substances on the farm and periodically thereafter as long as they remain assigned to this task. Other work that does not involve use of these five substances is offered to those organophosphate or carbamate pesticide handlers with results outside of the accepted cholinesterase levels.

This guide provides additional information about the annual medical monitoring of the applicator's health (kidney and liver function) and cholinesterase tests.

## 2. SAN RISK MANAGEMENT REQUIREMENTS FOR WORKER'S HEALTH

### 2.1. ANNUAL MEDICAL MONITORING (KIDNEY AND LIVER FUNCTION)

The objective of the annual medical monitoring (with emphasis in kidney and liver function monitoring) is to decrease health risks of workers who handle organophosphates or carbamates pesticides. In order to do this, SAN requires:

- 2.1.1. Pre-exposure medical monitoring:** a medical monitoring is carried out on all workers before they start with any activity that requires the handle of organophosphates or carbamates. It includes:
- a) Complete pre-exposure clinic history, as a baseline document for the periodic medical monitoring during work, which also allows an epidemiological surveillance.
  - b) Record of inherited family conditions regarding pathologies present in the worker's offspring.
  - c) An occupational history that includes:

- i. Summary of previous works and description of the work carried out,
  - ii. Exposure to pesticides (name of the product),
  - iii. Work schedule
  - iv. Work period,
  - v. Hygiene measures,
  - vi. Use of personal protection equipment while doing their work,
  - vii. History of previous poisoning,
- d) Complete physical examination.

**2.1.2. Periodic medical monitoring:** periodic monitoring consists of an annual check-up, which includes:

- a) A health status follow-up and an evaluation of the sequelae in those workers who underwent any acute intoxication with pesticides;
- b) Updated the exposure to pesticides indicating the name of the products;
- c) Updated the family history of pathologies present in the worker's offspring;
- d) Updated medical history;
- e) Performance of a physical examination

Specifically for **kidney and liver function**, the following tests are included:

- a) Urinalysis, and renal function tests: urea nitrogen and creatinine;
- b) Complete blood count: hemoglobin, hematocrit, mean corpuscular hemoglobin concentration, leukogram, platelets;
- c) Hepatic function tests: prothrombin time, thromboplastin time, oxalacetic transaminases or aspartate amino transferase (TGO or AST) and pyruvic or alanine amino transferase (TGP or ALT), gamma glutamyl transferase, alkaline phosphatase and bilirubin.

## 2.2. CHOLINESTERASE LEVELS ANALYSIS

Workers' cholinesterase levels may be affected by the manipulation of cholinesterase-inhibiting pesticides. To reduce health risks, SAN requires:

**2.2.1. Baseline level test:** all workers undergo a medical examination to determine their baseline plasma and erythrocyte cholinesterase levels prior to initiating any activity involving the handle of cholinesterase inhibitor pesticides, taking into account the following:

- a) In order to establish the personal level of erythrocyte cholinesterase and basal plasma cholinesterase, the worker must have remained free of exposure of cholinesterase inhibitor compounds for at least a month before the test.

- b) Baseline erythrocyte and plasma cholinesterase levels is the average of two or more exams in blood samples taken at least at the first interval within 72 hours and the other at no later than 14 days after at the same laboratory. The results of such exams should not differ by more than 15% between them.
- c) In case of deferring by more than 15%, a third sample must be taken 24 hours apart from the last, if this difference persists, the worker must remain free of the exposure of cholinesterase inhibitor compounds for an additional month, at the end of which it restarts with the established testing guidelines from the previous point.

It is suggested to determine baseline plasma and erythrocyte cholinesterase levels every two years, unless recent exams do not show decreases.

**2.2.2. Periodic monitoring:** periodic monitoring of tests to determine cholinesterase level considers the following:

- a) Frequency: the recommended frequency at which the tests to determine the cholinesterase levels are carried is the follow:
  - i. Any worker exposed to cholinesterase inhibitors, either organophosphates or N-methyl carbamates, for 20 hours or more within a period of 30 consecutive working days, should be tested for plasma and erythrocyte cholinesterase every 4 (four) weeks.
  - ii. For smaller exposures the frequency is 8 (eight) weeks.

The responsible doctor may prescribe the test to measure erythrocyte and plasma cholinesterase levels with a higher frequency.

**2.2.3. Analysis of results**

- a) When the worker's erythrocyte cholinesterase level falls by 25% of its baseline level, the worker is removed from exposure to these pesticides and assigned to another work that does not involve the handling of these pesticides.
- b) Workers can rejoin labor activities when personal levels of erythrocyte and plasma cholinesterase have reached 90% of their baseline level.