

Cleaner Air Oregon: How do agencies determine what is a health risk?

The Cleaner Air Oregon program developed by the Oregon Department of Environmental Quality and the Oregon Health Authority evaluates potential air toxics health risks to people near industrial and commercial facilities, and reduces those risks below action levels adopted in law or rules. The diagram shows how scientific information about air toxics is used to create health-based values, called “risk-based concentrations” that agencies can use to assess risks and protect Oregonians.

How do agencies determine risk from individual toxic air contaminants from a facility? The agencies use toxicity reference values, or “TRVs”, to assess these risks. Each air toxic has a specific TRV that has been set by federal and authoritative sources like EPA, using the best available science. A TRV is the concentration of an air toxic that may cause health problems. Each air toxic has several TRVs, depending on the type of health effect and whether exposure is for a long period of time (a “chronic” exposure) or short period of time (an “acute” exposure). TRVs only consider health risks related to breathing in the air toxic. Each air toxic can have up to three different TRVs- one for chronic cancer, chronic noncancer, and acute noncancer.

How do agencies know they are using the best available science to assess risk? A number of governmental scientific agencies have developed TRVs. These authoritative sources sometimes have slightly different TRVs for the same chemical. The diagram lists the agencies selected for chronic TRVs used in Cleaner Air Oregon. DEQ and OHA selected the most recently published TRVs from the list of agencies to ensure that chronic TRVs are based on the most recent review of scientific studies by an authoritative source. DEQ and OHA used different strategies to select TRVs from among authoritative sources for chronic and acute TRVs.

What is a Risk-Based Concentration? Risk is a combination of how harmful a contaminant is (toxicity), and how and for how long a person might come into contact with the contaminant (exposure). DEQ and OHA use these TRVs to determine the “toxicity” part of risk. To determine the “exposure” part of risk, the agencies apply “exposure factors” that adjust the TRV. Factors considered in determining exposure include 1) exposure time, frequency and duration, 2) early-life exposure, and 3) multi-pathway exposure. These exposure factors will change the TRV. The final “adjusted” TRV is called a Risk Based Concentration, or RBC.

RBCs are the numbers agencies will use to evaluate health risks from individual air toxics emissions, and determine whether the risk is above a level requiring a facility to take some action. There are separate RBCs for cancer risk, chronic (long-term exposure) noncancer risk, and acute (short-term exposure of 24 hours or less) noncancer risk.

The diagram shows how the selection of TRVs, when adjusted by exposure factors, results in risk-based concentrations.

How do other states determine risk from air contaminants? The approach DEQ and OHA are using to calculate RBCs is consistent with other state and federal programs, and with DEQ’s existing Cleanup Program. The agencies will use RBCs to calculate risks for an individual facility. Calculated risks for a facility would then be compared with Risk Action Levels, the levels at which facilities must take action to reduce risk.

The Cleaner Air Oregon [Toxicity Reference Values and Risk-Based Concentrations fact sheet](#) provides a more detailed explanation on the selection of scientific agencies and strategies used to develop risk-based concentrations for chronic and acute TRVs.

Diagram: Process to Identify Risk-Based Concentrations

