



Guidance for San Francisco Residents and Public Agencies: Lead Hazard Risk Assessment and Management of Urban Gardens and Farms

Executive Summary

Since most soils in San Francisco contain lead, particularly in lots adjacent to older buildings, the Children's Environmental Health Promotion Program of the San Francisco Department of Public Health (Health Department) recommends gardening and farming in new soil rather than extensive and expensive testing and removing of existing soil. Planting in raised beds, either boxed or not, with clean soil over a barrier to the native soil provides a safer method to ensure non-contact with potential lead-contaminated soil. Any purchased soil or compost product, whether bulk or in bags, should contain the OMRI label and should be sample tested by an NLLAP lab to ensure that the purchased lot has a lead level below 80 parts per million (ppm). This document also includes resources, such as where to buy certified soil and compost products.

I. Introduction and Purpose

Gardening is beneficial to public health, both by creating greater access to fresh food and through promoting outdoor physical activity. However, urban gardening may result in lead hazard exposure to individuals by either direct contact with lead in soil or lead hazards on adjacent painted surfaces, or by the consumption of food grown in lead-contaminated soil. Children participating in gardening activities are at greatest risk from these hazards. The purpose of this guidance is to reduce the human health risks from exposure to lead from urban gardening in San Francisco. This guidance includes protocols for conducting Lead Hazard Risk Assessment (LHRA) for urban gardens or farms and for managing and mitigating identified hazards.

II. Background

Human and childhood exposure to lead is a well documented and a significant preventable environmental health problem. Chronic exposure can damage the nervous system, impair brain development, result in iron deficiency and anemia, and harm the kidneys and other major organs. Young children are at greatest risk to harm from lead exposure because their brains and nervous systems are still forming. Studies of children show that even small amounts of lead in the body can make it hard for children to learn, pay attention, and succeed in school. *Lead can readily cross the placenta so lead exposure to pregnant women can also harm the developing fetus.*

In the context of urban gardens, exposure to lead is most likely to come from contaminated soil. When children play outdoors, lead-contaminated dirt and dust can get on hands, clothes, toys, food and pets. Most commonly, ingestion of lead occurs from touching or handling soil and later putting hands or fingers into the mouth. Some children seek nourishment from eating soil and therefore direct ingestion of lead in soil may occur. Peeling, flaking, and other deteriorated paint conditions can expose children to lead if they touch those deteriorated surfaces and later put their hands or fingers into their mouths. In some cases, chips of lead-based paint may also be picked up and eaten. Soil and dust containing lead can also be tracked into the home by people and pets.

Evidence suggests that many urban gardening sites in San Francisco may be contaminated with lead. Most urban gardens will be in close proximity to residential buildings and greater than 90% of residential buildings in San Francisco have at one time been painted with lead-based paint. In the course of time, lead paint dust and debris has been deposited in soil adjacent to all pre-1979 buildings due to routine preparation techniques used prior to repainting as well as the normal paint weathering process. Safe work practices disturbing paint on building exteriors were not required until 1998, so migration of lead paint dust and deposition into the soil were common.

Urban gardening sites adjacent to busy roadways may be contaminated via past deposition of lead from lead gas vehicle emissions. Additionally, many sites with an industrial or commercial history can be expected to have lead in soil contamination as well as other heavy metals.

In 2009, the Office of Environmental Health Hazard Assessment (OEHHA) of the CalEPA published a report that was based upon review of evidence and the use of a health-risk model. OEHHA estimated that a soil lead concentration of 80 parts per million (ppm) would result to an incremental increase in blood lead (BLL) of up to 1 microgram per deciliter ($\mu\text{g}/\text{dL}$) in about 10 percent of children. OEHHA further determined that an increase in children's blood lead of one microgram per deciliter of blood ($1 \mu\text{g}/\text{dl}$) may lead to significant health risks to children. (<https://oehha.ca.gov/media/downloads/crn/leadchhsl091709.pdf>).

III. Steps in Lead-Safe Gardening and Farming

A. Conduct a visual assessment of the site

Any pre-1979 building surfaces with damaged or deteriorated paint should be presumed to be a potential lead hazard (See Article 11, Section 581(10) of the San Francisco Health Code). Therefore, the Health Department recommends a visual assessment of the painted surfaces adjacent to the garden before constructing a garden for food production or other gardening activities.

If damaged or deteriorating painted surfaces are visible adjacent to a garden, this is sufficient evidence to document a lead paint hazard. Call 311 to make a complaint about the deteriorated paint. Wait for the deteriorated paint conditions to be corrected before starting the new garden.



* Note that US Environmental Protection Agency (EPA) and California Department of Public Health (CDPH) use 400 ppm or greater of lead in bare soil as their definition of a lead in soil hazard and the CalEPA State Water Resources Control Board (SWRCB) uses 200 ppm or greater of lead for their definition of clearance prior to land use development. Neither of those values is based on the prevention of significant health effects to children.

B. Identify Soil and Compost Materials with OMRI Certification

The Health Department recommends purchasing clean soil and compost to create a raised bed or box** over a barrier between contaminated soil and new soil. Commercially available soil and compost – either bagged or in bulk, cannot be guaranteed to have a lead level less than 80 ppm; current regulations allow products to contain up to 300 parts per million of lead. Therefore, if at all possible, purchase products that has been certified as “organic” by the California Department of Food and Agriculture AND the Organic Materials Review Institute (OMRI). The OMRI is a third-party organization that tests gardening and farming products. When a material has been tested and reviewed by OMRI, it should contain less than 90 ppm of lead. While the use of these products do not ensure that plants will not uptake a certain amount of lead, it does create a greater certainty that children will not be exposed to a level greater than 80-ppm. On page 4 is a list of San Francisco or Bay Area stores or distributors that sell OMRI certified products.

**Do not use recycled or chemically treated material such as windows, painted lumber, tires, railroad ties, or old bathtubs as planter boxes. These products may contain lead and other metals.

C. Verifying New Soil Lead Content

When children will be involved in a gardening project and it is not possible to use products with OMRI certification, the Health Department recommends that the products be tested to ensure that the lead level in them is less than 80 ppm. To test a soil product, put a small quantity of it in a zip lock back and send it to a qualified laboratory.

Lead testing of non-medical samples should be performed by a laboratory with a NLLAP accreditation (National Lead Laboratory Accreditation Program). A list of these laboratories can be found here:

<https://www.epa.gov/sites/production/files/2016-09/documents/nllaplist.pdf>

D. Other Precautions

1. In order to maintain a low lead level in the garden, the following precautions should be taken:
 - Use only hoses and spray nozzles without lead (e.g., vinyl hoses and brass nozzles contain lead).
 - Monitor the paint and stained surfaces of adjacent buildings to ensure that flaking paint is not contaminating the garden.
2. Persons working in gardens extensively, especially in existing soil should wear gloves and wash hands after handling soil.
3. If the disposal of potentially lead-contaminated soil were necessary, the soil might be considered by the California Department of Toxics Substances Control as a hazardous waste. Information for San Francisco households disposing hazardous wastes www.sfhazwaste.com
4. If it were necessary to hire a professional to test soil for lead, the professional must be a California Department of Public Health Lead-Certified Inspector/Risk Assessor. A list of these professionals can be found here: <http://www.cdph.ca.gov/programs/CLPPB/Pages/LRCCertList.aspx> The samples must be analyzed in a NLLAP laboratory.

For more information on these Guidelines, contact The Children’s Environmental Health Promotion Program (415) 252-3956.

References and Resources

General Information on Lead

- US Environmental Protection Agency <http://www.epa.gov/lead/index.html>

Lead and Human Health

- Center for Disease Control <http://www.cdc.gov/lead>
- California Department of Public Health <http://www.cdph.ca.gov/programs/CLPPB/Pages/healthinfo-CLPPB.aspx>
- Cal/EPA OEHHA Residential California Human Health Lead Screening Level which was finalized in September 2009 <https://oehha.ca.gov/media/downloads/cnr/leadchhs1091709.pdf>
- Cal/EPA OEHHA "Child-Specific Benchmark Change in Blood Lead Concentration for School Site Risk Assessment," finalized in April 2007 <https://oehha.ca.gov/risk-assessment/cnr/final-report-chrc-lead>
- US ATDSR. May 1992. *Analysis Paper: Impact of Lead-Contaminated Soil on Public Health* <http://www.ibiblio.org/london/agriculture/feedback/dirtfarmer/msg00116.html>

Growing Lead-Safe Produce

- *Home Gardens and Lead What You Should Know About Growing Plants in Lead-Contaminated Soil*; Arthur Craigmill and Ali Harivanil, UC Cooperative Extension; Publication 8424, September 2010 <http://anrcatalog.ucdavis.edu>

Where To Buy OMRI Certified Products

Some of the stores in San Francisco or Bay that sell OMRI certified products

- Lowe's - Kellogg
- Home Depot (Daly City) – Kellogg and EcoScraps
- Cole Hardware – Black Gold by Sun Gro
- Orchard Supply Hardware (South San Francisco) – Black Gold and Kellogg
- Flowercraft – Black Gold
- Acapulco Rock & Soil – Z-Compost (Richmond, but delivers to SF)
- American Soil & Stone – Three OMRI certified products: WonderGrow Organic Compost OMRI Listed, Super Grape Compost, Coconut Coir (Richmond, but delivers to SF)
- Sonoma Compost Co. (Petaluma) – Five OMRI certified products: Sonoma Compost, Organic HI-TEST Compost, Mallard Plus, Vineyard Mulch, and Sonoma Feather-Lite Amended Soil

Lead Safe Work Practices and Disposal

- California Department of Public Health (CDPH), Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards (Title 17, California Code Regulations, Division 1, Chapter 8): <http://www.cdph.ca.gov/programs/CLPPB/Pages/LRCProgOver.aspx> and <http://www.cdph.ca.gov/programs/CLPPB/Documents/Title17.pdf>
- San Francisco Department of Building Inspection SF Building Code Chapter 34, Section 3425, "Work Practices for Lead-Based Paint on Pre-1979 Buildings and Steel Structures," brochure: http://www.sfdbi.org/ftp/uploadedfiles/dbi/Key_Information/WorkPracticesLeadBasedPaint.pdf
- US Environmental Protection Agency (EPA) Information about what to do before you renovate: <https://www.epa.gov/lead/protect-your-family-exposures-lead#before>

Case Study

The photographs shown here illustrate a community garden constructed adjacent to a residential building exterior with significant sections of peeling lead-based paint. A community group, including neighborhood children, constructed the garden with raised beds (upper photo). During the garden construction phase, children worked adjacent to the wall with damaged paint (lower photo).

Although the project coordinators tested the native soil for lead, they were unaware of all the elements of lead hazard risk assessment. For that reason, they did not evaluate the lead hazard risk from the significantly deteriorated paint on the wall adjacent to the garden. The damaged paint on this wall could easily be touched by the public.

The gardeners sampled the native soil and their results led them to believe that no lead hazards were present. Consequently, the garden was constructed and edibles were planted adjacent to the lead hazards from the deteriorated paint on the wall. It cost additional time and money to safely remediate these lead hazards as containment was needed to protect the recent plantings from the remediation activities.

