# Targeted Lead Screening Plan for the Prevention of Childhood Lead Poisoning

Arizona Department of Health Services

Prepared by the Office of Environmental Health

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# Contents

## Executive Summary

**The problem:** Lead has adverse effects on nearly all organ systems in the body, even at low blood lead levels, children's intelligence, hearing, and growth can be irreparably damaged. Exposure to lead is especially harmful to the developing brains and nervous systems of children under the age of 6 years. For this reason major public health campaigns have focused on eliminating childhood lead poisoning.

Many lead sources have been eliminated or reduced in the last few decades. However, lead poisoning continues to affect children in Arizona, primarily from paint, imported goods, food, medicines, spices, leaded crystal and pewter, lead in dust, soil, mining, drinking water, and occupation and hobbies. Because of ongoing surveillance and analysis, public health professionals are able to target surveillance and intervention efforts on the children most at risk. Based on recommendations and guidance from the CDC, many states, including Arizona, have moved from universal lead screening to targeted screening.

**The solution:** The Arizona Department of Health Services developed the following recommendations to identify lead poisoned children in order to eliminate exposure and reduce the effects of lead on Arizona children:

1. Children living in targeted ZIP codes: All children living in targeted ZIP codes should have a blood lead test at 12 and 24 months of age. Children aged 36 to 72 months should be tested if they have not been previously tested. Refer to Appendix C for a list of the targeted ZIP codes.

2. Children living outside of the targeted ZIP codes: Children living in Arizona, but not in a targeted ZIP code, should receive an individual risk assessment questionnaire at age 12 and 24 months of age. Refer to Appendix A for our recommended questions.

**Next Steps:** ADHS' three year goal is to increase the utility of the targeted screening plan by 1) increasing screening rates to 85% in targeted ZIP codes, 2) assessing the indicators used to develop the targeted high-risk ZIP codes, and 3) reducing the number of targeted high-risk ZIP codes.

# Introduction

## Childhood Lead Poisoning Background

Lead has adverse effects on nearly all organ systems in the body. Even at low blood lead levels, children's intelligence, hearing, and growth can be irreparably damaged. At very high blood lead levels children can have severe brain damage or even die. Exposure to lead is especially harmful to the developing brains and nervous systems of children under the age of 6 years. For this reason major public health campaigns have focused on eliminating childhood lead poisoning.

On a community level, lead exposure is associated with an increase in the number of children with developmental deficits and learning disorders. A number of studies have estimated that a child's IQ will drop by one to three points for every increase of 10 µg/dL in the child's blood lead level. As a result, childhood lead poisoning places an unnecessary and expensive burden on the educational system.

On a national level, childhood lead poisoning places a significant burden on the US healthcare system and to society as a whole. In 1991, the CDC estimated that the average benefit of preventing a child's blood lead level from rising above 24 µg/dL was $1,300 in medical and public health case management costs, and $3,331 in special education costs.

The Arizona Administrative Code (AAC) R9-4-302 states that a child is considered lead poisoned at a blood lead level equal to 10 µg/dL or greater. The Arizona Department of Health Services (ADHS) focuses education and intervention on cases above 10 µg/dL. The Centers for Disease Control and Prevention (CDC) previously identified 10 µg/dL as the threshold at which health effects become significant; however, evidence suggest that negative health effects can be seen at levels below 10 µg/dL. The CDC has recently lowered the diagnostic threshold to 5 µg/dL, which may triple the number of children considered to have lead poisoning. Although ADHS currently focuses education and intervention on cases with blood lead levels above 10 µg/dL, the program provides education and technical assistance to all parents, clinicians, and public health professionals who contact the program.

The elimination of childhood lead poisoning has been one of the most effective public health campaigns of the 21st century, but much work remains to be done. ADHS remains committed to preventing new cases of childhood lead poisoning from occurring, providing excellent case management to children with elevated blood lead levels, and safeguarding the health of Arizona's children as a whole.

## Sources of Exposure to Lead in Arizona

Like children across the nation, Arizona children can be exposed to lead in paint, dust, soil, mini-blinds, hobbies, and take-home occupational exposures. However, the unique makeup of Arizona's environmental landscape adds to the complexities of lead exposures to Arizona's children. Some of the unique lead exposures in Arizona are a result of living in proximity to the Mexico-Arizona border, mining, and immigration.

**Paint:** It is well documented that homes built before 1978 have potential to contain lead paint. The ADHS Children's Lead Poisoning Prevention Program (CLPPP) reports that lead-based paint has been

found in homes built after 1978. In these cases, the paint was reported to have been obtained in Mexico and brought across the border.

**Imported goods:** There have been several national recalls involving lead in imported goods such as toys, pottery, and makeup. Additionally, the ADHS CLPPP reports lead exposures from candy, pottery, and make-up that are brought across the US border. These types of cases generally escape recall attention. The CLPPP found 920,000 ppm in hanumam sindoor, a powder Hindu women use in their part line. Glazed pottery imported from other countries, most commonly in Arizona from Mexico, may contain lead. The Mexican pottery is used to cook beans or hot chocolate. Inexpensive toys, jewelry, and other objects sold in vending machines and discount stores may contain lead.

**Imported foods, medicines, and spices**: The CLPPP reports that lead has been found in foods and spices that were either bought locally in Asian import stores or brought with the family from other countries, e.g. India, and Mexico. Two home-remedies for stomach illness (*empacho*) or teething have been noted in lead poisoning cases: *azarcon* and *greta*. In several cases of children with elevated blood lead levels, spices were found to be heavily contaminated with lead (e.g. turmeric with 600-800 ppm lead).

Imported goods, foods, medicines, and spices have been a source of lead primarily in families who continue to visit their countries of origin and/or shop at local ethnic groceries.

**Table 1: Sources contributing to elevated blood lead levels in Arizona**

| **Child's Highest Blood lead Level (BLL)** | Contaminated Spice/s Found in Child's Home | Origin | Concentration of Lead in Spice |
|---|---|---|---|
| **16 µg/dL** | Turmeric | Brought from India by parents | 690 ppm |
| **Sibling 1: 23 µg/dL** | Turmeric | Brought from Bangladesh by parents | 770 ppm |
| **Sibling 2: 11 µg/dL** | Coriander | Purchased locally in Asian imports store | 17 ppm |
| **15 µg/dL** | Black Pepper Powder | Purchased locally in Asian imports store | 24 ppm |
| | Turmeric | Purchased locally in Asian imports store | 610 ppm |
| *** Sibling 1: 3 µg/dL** **Sibling 2: 5 µg/dL** | Thyme | Brought from Lebanon by parents | 890 ppm |
| **10.1 µg/dL** | Hanuman Sindoor | Brought from India by parents | 920,000 ppm |

* Although these siblings did not meet the ADHS case definition criteria of 10 µg/dL, an investigation was conducted for several reasons: their BLLs had increased from the previous year and the parents had BLLs of 16 and 20 µg/dL.

**Leaded crystal and Pewter**: Lead can be found in crystal and pewter objects, which may be modern or antiques and may have been imported or locally purchased.

**Lead in dust, soil, and mining:** Arizona children can come into contact with lead in soil and dust, whether naturally occurring, from mining, or from other activities in the yard or in the home. In many areas of Arizona, the soils are naturally high in metals like lead. In addition, mining activities, both historical and current, can make lead more readily available to human exposure. Zinc, gold, silver, lead, and copper are some of the most mined metals in Arizona. Currently, most of the mining focus is on copper, and some of the other metals can be produced as byproducts. Arizona produces 67% of the nation's copper from 126 mines across the state. Years ago, it was common practice in many mining towns to take mine tailings (the left over crushed ore that is the consistency of soil) to use as fill for residential yards.

**Water:** Lead can be found in Arizona water either from plumbing or from naturally occurring lead in groundwater. Plumbing is not usually an issue in Arizona because the hard water tends to coat the inside of the pipes making any lead in pipes or soldering less able to leach into the water. In Arizona, it is the homeowner's responsibility to test their wells and to take steps to ensure safe water for consumption. Many times, homeowners are unaware of the need for testing and/or they are unaware that testing and treatment are their responsibility.

**Occupation and hobbies:** Some occupations and hobbies can result in lead exposure. These include working with cars, batteries, radiator repair, construction, mining, glass making, metal working (including welding and cutting), electronics, plumbing, pottery, refinishing furniture, hunting, and making or using bullets, fishing weights, or sinkers.

## Targeted vs. Universal Screening

The principal federal recommendations on screening young children for lead poisoning are issued by the Centers for Disease Control and Prevention (CDC). State health departments and their partners are encouraged to develop formal childhood lead poisoning screening plans that echo the national guidelines, while still reflecting local conditions.

The CDC guidance recommends targeted screening in communities or states where less than 12% of children have lead poisoning and where 27% or fewer of houses were built before 1950. This recommendation is based partially on an analysis suggesting that the benefits of universal screening outweigh the costs only when the prevalence of lead poisoning is in the range of 11% to 14% or higher. Lead poisoning rates in Arizona meet these criteria for development of a targeted screening plan.

In addition to targeted screening based on geography (i.e. targeted ZIP codes), the CDC also recommends that children who meet any of the following criteria receive a blood lead screening test:

- Child has a sibling or frequent playmate with an Elevated Blood Lead Level (EBLL).
- Child is a recent immigrant, refugee, or foreign adoptee.
- Child's parent or principal caregiver works professionally or recreationally with lead.
- Child has a household member who uses traditional, folk, or ethnic remedies or cosmetics or who routinely eats food imported informally (e.g., by a family member) from abroad.

ADHS has developed a Targeted Screening Policy for children who are at higher risk of lead poisoning. Surveillance data is analyzed annually to identify ZIP codes at greater risk of childhood lead poisoning. These ZIP codes are identified as targeted high-risk ZIP codes and are listed below.

## The Arizona Targeted Screening Plan

ADHS developed a lead poisoning risk index (described below) to identify geographical areas where children are at increased risk of being lead poisoned. Other factors can also affect a child's individual risk of lead poisoning. The Arizona Targeted Screening Plan addresses geographical as well as other risk factors for lead poisoning with two approaches: the targeted high-risk ZIP codes and the individual risk assessment.

## Targeted High-Risk ZIP Codes

All children living in targeted ZIP codes should have a blood lead test at 12 and 24 months of age. Children aged 36 to 72 months should be tested if they have not been previously tested. Children living outside of the targeted ZIP codes should receive an individual risk assessment (e.g. questionnaire).

## *Identification of high-risk ZIP codes*

ADHS developed a lead poisoning risk index to identify high-risk ZIP codes in Arizona. The indicators and methods used are described below.

### *Description of risk index*

To better identify children with elevated blood lead levels, ADHS developed a geographic targeted screening policy for children who are at greater risk of lead poisoning. The Office of Environmental Health (OEH) at ADHS incorporated demographic and household data from the 2010 U.S. Census, the 2012 American Community Survey (ACS), and surveillance data reported by state laboratories and physicians into a single lead poisoning risk score. The score is based on previous reports of lead poisoning as well as key socio-demographic variables that are known correlates of lead exposure.

### *Analytical methods*

All data were analyzed using ArcGIS software (ESRI, Redlands, CA) and SAS 9.3 (Cary, NC). To create the lead poisoning risk index, surveillance data were geocoded and aggregated to the census tract level. While previous lead poisoning risk indices produced by ADHS report data at the ZIP code level, the most current Census data available at the ZIP code level is from the 2000 Census and would not accurately represent the current population. Therefore, the risk index was revised to use 2010 Census and 2012 ACS data at the census tract level. A lead poisoning risk score was calculated for each census tract.

### *Indicators*

Variables incorporated into the lead poisoning risk index include:

A. *The number of cases aged 0-5 years with a blood lead level of 10 µg/dl or greater, 2003-2012*

**Source:** Surveillance data collected throughout the state of Arizona by laboratories and physicians.

**Specific data preparation:** Cases of children 0-5 years of age with blood lead levels of 10 µg/dl or greater reported to ADHS from 2003-2012 were geocoded to the census tract level using Centrus (Pitney Bowes, Stamford, CT). 1,618 cases were reported and a census tract could be obtained for 1,422 (88%).

**Justification:** The census tract residence of reported cases of lead poisoning is the best and most readily available correlate of census tract-level risk of exposure to lead.

B. *Percent of the population under the age of five*

**Source:** DP-1 Profile of General Population and Housing Characteristics 2010 Census Summary File 1.

**Justification:** While lead poisoning may contribute to adverse health effects in all individuals, it is especially harmful to the developing brains and nervous systems of young children. Because of the

potentially irreparable, long-term health impacts of lead poisoning, children under the age of five are critical to the targeted screening policy of ADHS.

*C. Percent of the population that identify themselves as Hispanic Latino*

**Source**: DP-1 Profile of General Population and Housing Characteristics 2010 Census Summary File 1.

**Justification:** Lead-containing folk remedies, toys, foods, candies, and pottery imported from foreign countries, but particularly from Mexico, are significant sources of lead exposure in Arizona. In 2005, approximately 75% of lead poisoning cases reported to ADHS identified themselves as Hispanic Latino. This population is still considered to be at higher risk of lead exposure.

*D. Percent of houses whose occupants speak only Spanish*

**Source:** DP02 Selected Social Characteristics in the United States 2012 American Community Survey 5-Year Estimates.

- Justification: ADHS incorporated data for households that spoke Spanish as an additional proxy for identifying homes of children with exposure to imported lead-containing products, especially from Mexico. (http://www.cdph.ca.gov/programs/CLPPB/Pages/LeadPoisoningOverview.aspx#riskfactors)

*E. Percent of families whose income is below the poverty line*

**Source:** DP03 Selected Economic Characteristics 2012 American Community Survey 5-Year Estimates.

**Justification:** Low income has been shown to be associated with greater risk of exposure to lead. (http://www.cdph.ca.gov/programs/CLPPB/Pages/LeadPoisoningOverview.aspx#riskfactors). Additionally, families whose income is below the poverty line have been shown to be less likely to seek medical attention. For these reasons, and due to the lasting effects of lead-poisoning, it is important to include this metric in the risk index.

*F. Percent of houses built before 1980*

**Source:** DP04 Selected Housing Characteristics 2012 American Community Survey 5-Year Estimates.

**Specific data preparation:** The total number of housing structures built before 1980, which includes all structures built 1979 and earlier, was divided by the total number of housing structures located within each census tract.

**Justification:** Lead-based paint in housing structures constructed prior to 1978, the year the use of lead in paint was banned, and represents a significant source of lead poisoning for children in Arizona. Because the 2010 Census data aggregates housing structures based on decadal stratifications as opposed to yearly stratifications (e.g. housing structures built between 1960 and 1969 constitute one stratification), this analysis includes housing structures built in 1979, one year after the federal ban on lead-based paint. While this likely results in a slight overestimation of the number of housing structures that are more likely to contain lead-based paint, excluding data of housing structures constructed between 1970 and 1979 would have likely resulted in a greater underestimation of exposure to lead-based paints in housing structures.

G. *Percent of individuals employed in the agriculture, forestry, fishing and hunting, mining, and construction industries*

**Source:** DP03 Selected Economic Characteristics 2012 American Community Survey 5-Year Estimates.

**Specific data preparation:** The total number of individuals aged 16 and older employed in the agriculture, forestry, fishing and mining, hunting, and construction industries was divided by the employed population 16 years and older for each census tract.

**Justification:** Individuals exposed to lead at work are likely to transport lead into their homes via their clothes, shoes, hair, or skin. http://www.cdc.gov/nceh/lead/publications/books/plpyc/chapter4.htm. Individuals' employment in certain occupations and engagement in certain hobbies, however, have an increased risk of lead exposure. Specific occupations that may expose individuals to lead include: construction, mining, painting, automobile repair, welding, electronics, and plumbing. Specific hobbies that may expose individuals to lead include: pottery, stained glass, refinishing furniture, firing ranges (particularly indoor ranges), hunting, and fishing. While not all individuals employed in these industries are exposed to lead, this measure serves as a proxy indicator for lead exposure by occupation at the census tract level.

The lead poisoning risk score was calculated as follows:

$$\text{Score} = A*0.14 + B*0.16 + C*0.14 + D*0.14 + E*0.14 + F*0.14 + G*0.14$$

The greater weighting of the percent of the population under the age of five was chosen to prioritize the population specific to this targeted screening policy. Census tracts with no residents less than five years old were assigned scores of zero. There is no threshold risk value that signifies elevated risk to lead poisoning because this index is specific to Arizona. Thus, the risk index was stratified into quintiles. A score in the top two quintiles (16.125 or higher) was classified as high risk. It is important to remember that only one of the seven variables incorporated in this index reflects reported cases of lead poisoning, and it was weighted at 14%. The remainder of the score (86%) is determined by demographic, socioeconomic, and household data that have been shown to be associated with increased risk of lead poisoning and have been included in previous risk indices developed by ADHS. As we have included numerous demographic, socioeconomic, and household variables and a single variable reflecting actual cases, certain census tracts have been identified in this analysis to be at elevated risk of lead poisoning even when no cases have been reported in residents within their boundaries; conversely, certain census tracts have been identified to be at low risk of lead poisoning even when one or more cases reside within its boundaries.

Population centroids for high risk census tracts were spatially joined to Arizona ZIP codes to obtain a final list of high risk ZIP codes. Since ZIP codes and census tracts are incongruent geographies, this list reflects the ZIP codes in which one or more high risk census tracts fall. Census tracts may cross multiple ZIP code boundaries and include populations from multiple ZIP codes. The population within a ZIP code may not experience the same level of risk. Thus, translating risk scores from the census tract level to the ZIP code level will introduce errors. Given the difficult of obtaining and using census tracts for patients in the clinical setting, ZIP codes were chosen as the best geography to assess risk of exposure because of the widespread use and availability of ZIP codes.

152 ZIP codes were identified as high risk (i.e. lead risk index score ≥ 16.125). These ZIP codes include 210,176 children five years of age or younger including 183,817 AHCCCS members. 1,157 (81%) of 1,422 lead poisoning cases five years of age or younger reported from 2003 to 2012 for whom a census tract residence could be determined resided in these ZIP codes.

## Individual Risk Assessment

In addition to living in a geographically high-risk area children may be at increased risk for lead poisoning if any of the following factors apply:

- Child has a sibling or frequent playmate with EBLL.
- Child is a recent immigrant, refugee, or foreign adoptee.
- Child's parent or principal caregiver works professionally or recreationally with lead.
- Child has a household member who uses traditional, folk, or ethnic remedies or cosmetics or who routinely eats food imported informally (e.g., by a family member) from abroad.

ADHS recommends Arizona physicians provide an individual risk assessment questionnaire to all children living outside a targeted ZIP code to determine if the children should receive a blood lead test. The assessment should be given at age 12 months and again at 24 months. Individual risk assessment questions are based on the most common exposures on a national and regional level. Validation studies have demonstrated that adding 5 region-specific questions increases the sensitivity and negative predictive value of the CDC questions. The CDC and ADHS recommend asking the questions found in Appendix A (provided in both English and Spanish) as part of an individual risk assessment.

## Summary of ADHS Recommendations

The Arizona Department of Health Services developed the following recommendations to identify lead poisoned children in order to eliminate exposure and reduce the effects of lead on Arizona children:

1. Children living in targeted ZIP codes: All children living in targeted ZIP codes should have a blood lead test at 12 and 24 months of age. Children aged 36 to 72 months should be tested if they have not been previously tested. Refer to Appendix C for a list of the targeted ZIP codes.

2. Children living outside of the targeted ZIP codes: Children living in Arizona, but not in a targeted ZIP code, should receive an individual risk assessment questionnaire at age 12 and 24 months of age. Refer to Appendix A for our recommended questions.

## Next Steps

ADHS conducted an analysis of the effectiveness of the lead poisoning risk index. The analysis determined that previous methods of identifying high risk ZIP codes would have missed actual lead poisoned children. In order to capture 80% of cases, the number of ZIP codes included in the 2014 targeted screening plan has increased since the 2013 targeted screening plan.

ADHS recognizes the list of targeted ZIP codes is fairly long. ADHS is committed to revising this list annually. ADHS' three year goal is to increase the utility of the targeted screening plan.

In order to accomplish this goal, ADHS has identified 3 main objectives:

A. **Improve the screening rate:** 85% of children in targeted ZIP codes receive at least one blood test before age 6

   Currently Arizona screening rates for blood lead levels are low (estimates range from 25% to less than 40%). By increasing screening rates, the predictive value of the targeted ZIP code formula will increase.

**B. Reassess the risk index annually**

   ADHS will reassess the indicators used in the targeted ZIP code formula by analyzing AZ lead poisoning screening data as well as reviewing relevant literature to identify better proxies for lead poisoning exposures. The current risk index focuses on Hispanic families and lead-containing products from Mexico. Arizona is home to many other families with unique cultural exposures, other than those from Mexico. ADHS will revisit the lead poisoning risk index and eliminate a focus on Hispanic families alone and explore how to incorporate proxies for additional cultural exposures.

   All indicators were given an equal weighting of 14% at that time of the analysis except for 'percentage of children under the age of five,' which was weighted at 16%. The greater weighting was chosen to prioritize the under-five year old population. When ADHS revisits the lead poisoning risk index, the weighting strategy will also be revisited. Some proxies may be better predictors for lead poisoning risk and as such, will be reflected in any weighting strategy updates.

**C. Reduce the number of targeted ZIP codes**

   The current formula identifies a long list of targeted ZIP codes, but by reassessing the indicators used annually in conjunction with improving screening rates, ADHS will improve the targeted ZIP code formula and produce a more streamlined (shorter) list of targeted ZIP codes.

# Appendix A: Risk Assessment Questions

## *English Language Individual Risk Assessment Questions:*

***CDC questions***

1. Does your child live in or regularly visit a house that was built before 1950 (this could apply to a home day care center or the home of a babysitter or relative)?
2. Does your child live in or regularly visit a house built before 1978 with recent or ongoing renovations or remodeling (i.e., within the past six months)?
3. Has a sibling or playmate been diagnosed or treated for lead poisoning?

***Arizona/Region-specific questions***

4. Does your child live with an adult whose job or hobby involves exposure to lead (e.g., mining, automobile repair, welding, construction, plumbing, shooting, hunting, fishing)?
5. Does your child live near an active lead smelter, battery recycling plant, or other industry likely to release lead?
6. Has your child been in Mexico, Central America, or South America in the past year?
7. Have you ever given your child any of these home remedies: Azarcon, Alarcon, Greta, Rueda, Pay-loo-Ah?
8. Does your child eat or drink from imported pottery or ceramic cookware?
9. Does your chid eat foods containing spices (turmeric) purchased in import stores or other countries, or imported candies (tamarind or chili)?
10. Does your child have pica or have a habit of eating dirt or other non-food items?

## *Spanish Language Individual Risk Assessment Questions:*

***Preguntas de los Centros para el Control y la Prevención de Enfermedades***

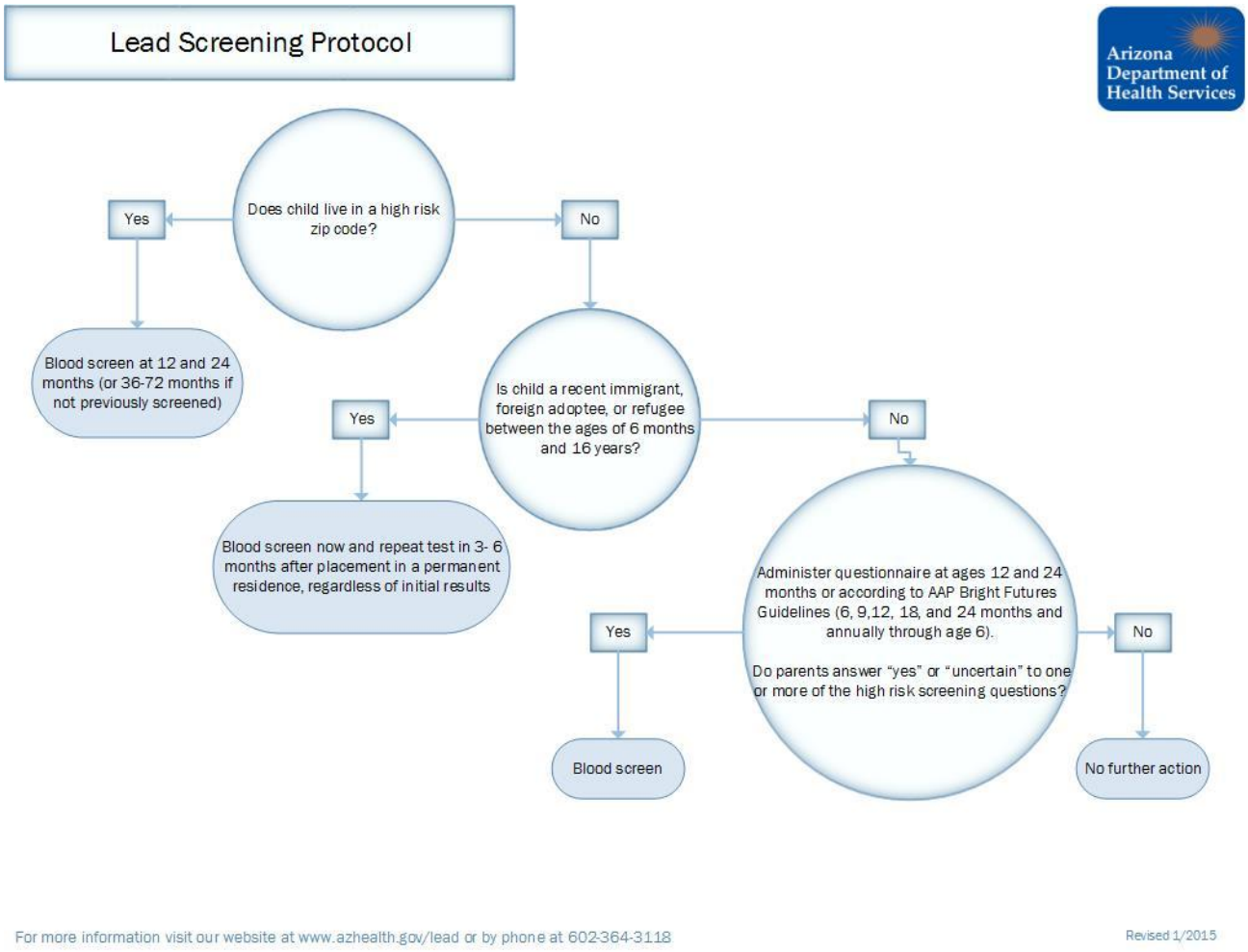
1. ¿Vive o visita regularmente su hijo en una casa construida antes de 1950 (incluyendo centros de ciudado infantil y casas de parientes o de niñeras)?
2. ¿Vive o visita regularmente su hijoen una casa construida antes de 1978 con restauración o remodelación reciente (es decir, en los últimos 6 meses)?
3. ¿) Tiene un hermano o amigo que ha sido diagnosticado o tratado por envenenamiento de plomo?

***Arizona: Preguntas específicas para la región***

4. ¿Vive su hijo con un adulto cuyo trabajo o pasatiempo le expongan al plomo (por ejemplo, la minería, la reparación de automóviles, la soldadura, la construcción, la plomería, el tiro al blanco, la caza, la pesca)?
5. ¿Vive su hijo cerca de un horno activo de fundición de plomo, una planta de reciclar baterías, u otra industria que tenga probabilidad de emitir plomo al aire ?
6. ¿ Su hijo visitado los siguientes lugares: México, América Central o América del Sur en el ano pasado?
7. ¿Le ha dado a su hijo los siguientes remedios caseros: Azarcón, Alarcón, Greta, Rueda o Pay-loo-Ah?
8. ¿ Su hijo come o bebe en cerámicas importadas o en vasijas u ollas de barro?
9. ¿La comida de su hijo contiene especias compradas en otros países o compradas en tiendas de importación (por ejemplo, la cúrcuma o eltumeric), o ha comido dulces importados (por ejemplo, los dulces con tamarindo o con chile)?
10. ¿ Suele comer su hijo sustancias sin valor nutritivo, como tierra u otras cosas que no son comida?

## Appendix: B Clinical Algorithm

The following algorithm may be useful for clinicians in assessing an individual's risk of exposure to lead.



## Appendix C: Targeted High-Risk ZIP Codes

| List of Targeted High-Risk ZIP Codes Sorted sequentially | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 85003 | 85006 | 85007 | 85008 | 85009 | 85012 | 85013 | 85014 | 85015 | 85016 |
| 85017 | 85018 | 85019 | 85020 | 85021 | 85022 | 85023 | 85028 | 85029 | 85031 |
| 85032 | 85033 | 85034 | 85035 | 85037 | 85040 | 85041 | 85042 | 85043 | 85051 |
| 85053 | 85119 | 85120 | 85122 | 85128 | 85131 | 85132 | 85137 | 85138 | 85139 |
| 85173 | 85192 | 85194 | 85201 | 85202 | 85203 | 85204 | 85205 | 85207 | 85208 |
| 85210 | 85212 | 85213 | 85225 | 85226 | 85250 | 85251 | 85254 | 85257 | 85281 |
| 85282 | 85283 | 85301 | 85302 | 85303 | 85304 | 85321 | 85323 | 85326 | 85335 |
| 85337 | 85338 | 85339 | 85344 | 85345 | 85347 | 85348 | 85349 | 85350 | 85353 |
| 85354 | 85356 | 85363 | 85364 | 85365 | 85378 | 85392 | 85501 | 85530 | 85533 |
| 85534 | 85539 | 85540 | 85543 | 85546 | 85552 | 85602 | 85603 | 85607 | 85614 |
| 85615 | 85617 | 85621 | 85623 | 85629 | 85631 | 85632 | 85634 | 85635 | 85638 |
| 85643 | 85646 | 85648 | 85701 | 85704 | 85705 | 85706 | 85710 | 85711 | 85712 |
| 85713 | 85714 | 85715 | 85716 | 85719 | 85730 | 85735 | 85736 | 85741 | 85745 |
| 85746 | 85750 | 85756 | 85757 | 85925 | 85936 | 85941 | 86004 | 86025 | 86033 |
| 86046 | 86047 | 86301 | 86314 | 86320 | 86321 | 86326 | 86401 | 86409 | 86442 |
| 86535 | | | | | | | | | |

| List of Targeted High-Risk ZIP Codes Sorted by county and city | | |
|---|---|---|
| **County** | City | ZIP Codes |
| **Apache** | Eagar | 85925 |
| | St. Johns | 85936 |
| | Dennehotso, Teec Nos Pos | 86535 |
| **Cochise** | Hereford | 85615 |
| | McNeal | 85617 |
| | San Simon, Portal | 85632 |
| | Sierra Vista | 85635 |
| | Tombstone | 85638 |
| | Willcox, Ft Grant | 85643 |
| | Benson | 85602 |
| | Bisbee | 85603 |
| | Douglas | 85607 |
| **Coconino** | Flagstaff | 86004 |
| **Gila** | Globe | 85501 |
| **Graham** | Bylas | 85530 |
| | Miami | 85539 |
| | Pima | 85543 |
| | Safford | 85546 |

| | | |
|---|---|---|
| | Thatcher | 85552 |
| **Greenlee** | Clifton | 85533 |
| | Duncan | 85534 |
| | Morenci | 85540 |
| **La Paz** | Parker | 85344 |
| | Salome | 85348 |
| **Maricopa** | Avondale | 85323, 85392 |
| | Buckeye | 85326 |
| | Chandler | 85225, 85226 |
| | El Mirage | 85335 |
| | Glendale | 85301, 85302, 85303, 85304 |
| | Gila Bend | 85337 |
| | Goodyear | 85338 |
| | Guadalupe | 85283 |
| | Laveen | 85339 |
| | Mesa | 85201, 85202, 85203, 85204, 85205, 85207, 85208, 85210, 85212, 85213 |
| | Peoria | 85345 |
| | Phoenix | 85003, 85006, 85007, 85008, 85009, 85012, 85013, 85014, 85015, 85016, 85017, 85018, 85019, 85020, 85021, 85022, 85023, 85028, 85029, 85031, 85032, 85033, 85034, 85035, 85037, 85040, 85041, 85042, 85043, 85051, 85053, |
| | Scottsdale | 85250, 85251, 85254, 85257 |
| | Surprise | 85378 |
| | Tempe | 85281, 85282, 85283 |
| | Tolleson | 85353 |
| | Tonopah | 85354 |
| | Youngtown | 85363 |
| **Mohave** | Kingman | 86401, 86409 |
| | Bullhead City | 86442 |
| **Navajo** | Whiteriver | 85941 |
| | Holbrook | 86025 |
| | Kayenta | 86033 |
| | Williams | 86046 |
| | Winslow | 86047 |
| **Pima** | Ajo | 85321 |
| | Green Valley, Madera Canyon, Sahuarita | 85614 |
| | Sahuarita | 85629 |
| | Sells, Pisinemo | 85634 |
| | Tucson | 85701, 85704, 85705, 85706, 85710, 85711, 85712, 85713, 85714, 85715, 85716, 85719, 85730, 85735, 85736, 85741, |

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|---|---|---|
| | | 85745, 85746, 85750, 85756, 85757 |
| **Pinal** | Apache Junction | 85119, 85120 |
| | Casa Grande | 85122, 85194 |
| | Coolidge | 85128 |
| | Eloy | 85131 |
| | Florence | 85132 |
| | Kearny | 85137 |
| | Maricopa | 85138 |
| | Superior | 85173 |
| | Winkelman, Dudleyville | 85192 |
| | Oracle | 85623 |
| | San Manuel | 85631 |
| **Santa Cruz** | Nogales | 85621 |
| | Tubac | 85646 |
| | Rio Rico, Nogales | 85648 |
| **Yavapai** | Prescott | 86301 |
| | Prescott Valley | 86314 |
| | Ash Fork | 86320 |
| | Bagdad | 86321 |
| | Cottonwood | 86326 |
| **Yuma** | Roll | 85347 |
| | San Luis | 85349 |
| | Somerton | 85350 |
| | Wellton | 85356 |
| | Yuma | 85364, 85365 |

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