155 NE 100TH ST., SUITE 100 SEATTLE, WA 98125
WAPC.ORG (206) 517-2350

WASHINGTON POISON CENTER

DATE: September 7 2017

TO: Kevin Walder
Administrative Regulations Analyst
Division of Occupational Safety and Health
Department of Labor & Industries

FROM: Erica L. Liebelt MD FACMT
Medical Director, Washington Poison Center
Clinical Professor of Pediatrics and Internal Medicine
University of Washington School of Medicine

Re: WISHA Lead Rule- First Draft

As a medical toxicologist, I have been involved in the evaluation and treatment of children and adults with elevated lead concentrations and lead poisoning for 25 years. Lead is one of the only environmental toxins where there is validated and conclusive scientific evidence demonstrating its adverse effects and toxicity with both acute and chronic exposure. Studies have demonstrated adverse effects of lead exposure across populations even at low concentrations with newer studies reporting evidence that there may not be a threshold for toxicity.

Lead can have toxic effects on the neurologic, endocrine, hematologic, renal, and reproductive systems in both adult men and women as well as children. There has been increasing evidence over the last 10-15 years that chronic low level lead exposure in the occupational setting can result in significant adverse health effects in adults including neurotoxicity, where it was formerly thought that the adult central nervous system was “immune” to the effects of lead.

It is imperative that revision of the current adult lead rule be undertaken with a focus on stricter criteria for blood lead screening, monitoring, and evaluation of workers exposed at much lower concentrations than previously designated.

Below are my comments on WISHA Lead Rule – First Draft. These comments are based on my knowledge and clinical experience and are focused on the medical aspects of evaluation and toxicity.

WAC 296-857-60050 Selecting a Medical Physician

See my comments below

Page 36:
"Some of this blood lead is quickly excreted from the body in urine".
Comment: *The sentence is misleading*. A very very small percentage of lead is excreted via urine. Rabinowitz reported a mean half-life of 36 days for the blood compartment of lead with urinary excretion. The biologic half-life of lead in the bones is years and years. Thus, the physiologic excretion of lead takes a long time.

Page 37:

I understand the units for reporting lead as µg/dL; however, it is my understanding that the recommended nomenclature is **mcg/dL** . I believe there are several reasons for this – errors in transcription; all the EMRS I have used use the **mcg/dL**.

I would recommend checking and conforming with the standard nomenclature for this unit.

Page 37 Health Effects Linked with lead Exposure

Comments:

- Nervous system: I would include behavioral changes including hyperactivity and peripheral neuropathy. The latter is seen more commonly in adults with occupational exposure
- Most people with elevated blood lead concentrations are asymptomatic including children. (that is the main reason why people tend to "ignore" the whole problem of lead toxicity and elevated blood lead concentrations).

Page 38 Qualifications

"Medical physician may perform employee medical surveillance as allowed under their licensing."

I'm not sure I understand this unless there is something on the Washington State Medical license that I missed when I applied for mine.

What criteria on **licensing** allows some physicians to perform surveillance and others to not? Can any physician with a WA state medical license perform this surveillance exam? I think this sentence should be clarified. If this rule wants physicians with certain training/certification or a skill set to perform these surveillance exams, the criteria should be clearly delineated.

Page 39 Differentiating criteria for acute blood lead removal and long-term blood lead removal:

The absolute BPb concentration does not always, in and of itself, differentiate between acute and chronic exposures. I have always advocated for the use of **a Free Erythrocyte Protoporphyrin (FEP) or ZPP (Zinc protoporphyrin)** to help make this distinction, especially when you are looking at a difference between 20 and 30 mcg/dL. Chronic exposures, even at low concentrations, will elevate the FEP/ZPP after about 6 weeks. You can also use the FEP/ZPP to determine re-exposure (returning to the workplace) when the BPb may not change that much. This is very commonly seen in children.

Page 39 Blood Lead Testing

Using the airborne lead monitoring level of 10 ug/m3 TWA should not be the only criteria for requiring blood lead testing. This was discussed at length at the August 9 L&I Stakeholder meeting.

Page 40 Blood Lead Testing

General comment: I could not find anywhere in the document where it was specifically delineated as a blood **venous** lead concentration. With all the Point of Care (POC) machines out there being used, it is important to delineate if a venous specimen is required. If you feel that that some of the POC devices provide the sensitivity and specificity for BPb test with a finger stick, then this should be delineated. I don't think it is wise to assume that a venous sample will be collected.

Page 40 Content of Medical Examination

General comments: One of the questions I frequently am asked is *"What am I looking for on the physical exam and lab tests that I am being asked to order?"*
Again, most children/adults with elevated BPb concentrations, even > 100 mcg/dL, are asymptomatic. Are the specific findings on physical exam (peripheral neuropathy, cognitive deficits, behavior changes) and laboratory testing (e.g. microcytic anemia, elevated Creatinine, proteinuria) delineated anywhere for the physician performing the surveillance examination? Related to my previous comment, if there are specific licensing requirements for physicians performing these exam, perhaps these are delineated somewhere that I am not aware. Thus, my question/comment may not be relevant.

I don't think a peripheral blood smear is necessarily helpful. You can detect microcytic anemia with red blood cell indices (MCV, MCHC). Basophilic stippling is rarely seen in a peripheral smear and should not be relied upon.

Two other comment related to this document:

The interval for repeating BPb is challenging as it depends on the initial exposure situation, degree of elevation, previous elevation of BPb, whether the patient received chelation and other factors. This is another very frequent question I am asked and there is not a "cookbook" answer. However, I realize the need for making general recommendations. I would be in favor of more frequent intervals- for chronic exposures – every 2-3 months and for acute exposures every 1-2 months; however, these are general recommendations.

Secondary exposure of children to lead from parental clothes, etc. also occurs. Using only airborne concentrations as a determinant of obtaining BPb will miss some exposed workers and potentially allow secondary exposure in children.