# Eaton – Vermont Senate Testimony on Lead in Cosmetics

Thank you Ms. Stanton for the kind introduction, and thank you all for the opportunity to address this important body of the Vermont Government. I am honored to be here before you this morning, and hope that you find my analysis and conclusions of value in your decision-making.

In retirement, I've been focusing on how the science of toxicology and environmental risk assessment can be used effectively to address important environmental health risks from public exposure to toxic chemicals. This requires the use of the basic principles of toxicology and risk assessment to help regulators distinguish public health risks that are significant, from those that are not. This often involves helping distinguish 'risk' from 'hazard', which in turn requires careful assessment of exposure and 'dose-response'.

Now, the Issue at hand- does the presence of low part per million levels of lead in cosmetics/personal care products present a potentially significant public health risk, and will lowering the concentration below 10 ppm help reduce that risk?

For lead, the public health focus is almost exclusively on incidental exposures of lead to small children that results from

exposure to contaminated soil/household dust, or in some instances lead-containing toys or lead-contaminated food or drinking water. For several well-characterized reasons, young children are much more susceptible to the adverse effects of lead than adults. If you protect children, you will also protect adults.

The question then becomes, does the presence of trace amount of lead in cosmetics (e.g., 10 ppm) contribute significantly to overall childhood lead exposure from the other common sources of lead in the environment?

To address this question, I did a fairly detailed 'situation-specific' risk assessment to determine the potential exposure – and thus risk- of lead in cosmetics, using well accepted standardized approaches to risk assessment. The hazard -the potential to cause harm- is well known – but risk requires estimates of exposure and dose – how much, and how often. For my exposure assessment, I assumed that a cosmetic contains 10 ppm lead – the current allowable level in the US. For cosmetics, there are three possible pathways for exposure:

a) the most obvious is dermal exposure from direct application to the skin. However, it is well established scientifically that the absorption of lead in the form found in soil is not a significant pathway of exposure in children or adults. Skin contact can, however, lead to oral exposure via 'hand to

mouth' contact, which is widely recognized as the most important pathway of exposure of children to lead.

b) Inhalation exposure, like dermal exposure, has been shown not to be a significant pathway of exposure to lead except in occupations where lead fumes might be present.

c) Thus, oral (ingestion) exposure is the only plausible route of exposure to lead in soil or house dust, and this holds for lead in cosmetics as well. But how much cosmetic could reasonably be ingested? Based on decades of research on lead exposure to children from lead-contaminated house dust and soil, the EPA, FDA and other regulatory agencies have developed a model that allows one to reasonably estimate how much ingestion of lead is associated with an increase in the level of lead in blood – so called 'Blood Lead Level' – the gold standard for determining excessive exposure to lead. These studies demonstrate that a small child exposed to 1 microgram of lead on a daily basis over the period of weeks, months and years, would have an increase in their BLL of about 0.16 ug/dL. The 'typical' background level of lead in US children in 2021 was determined from representative national sampling (NHANES survey) to be about 0.6 ug/d, consistent with numerous estimates that daily exposures to

lead from diet, drinking water, housedust, etc is around 3-5 ug per day for a young child.

d) To determine the potential 'worst case' level of exposure to a child from cosmetics used by the mother, I made a series of conservative assumptions, based on measurements of how much cosmetic is typically used and how much could be transferred to a child's skin – using these 'worst case' assumptions – which likely over estimate 'real world' exposure by an order of magnitude or more – I estimated that the maximum daily exposure to lead from cosmetics containing 10 ppm of lead would be less than 0.02 ug. This theoretically would increase a child's 'Blood Lead Level' by 0.0032 ug/dL. This is not measurable, and would have no biological effects. It represents the amount of lead found in one teaspoon of water that the FDA allows in school drinking water (5 ppb). The new EPA recommendation for lead in children's playgrounds/school yards is 100 ppm. Based on decades of studies, the EPA and other regulatory agencies agree that a typical child ingests about 70 mg of soil/house dust per day, from 'hand to mouth' contact. The level of ingested lead from 70 mg of soil containing 100 ppm lead (EPA acceptable value) thus would be 7 ug of lead. This is

350 times greater than the maximum exposure to a child that could result from exposure to lead in cosmetics.

**From my analyses I provide the following conclusions:**

1. The presence of trace levels (10 ppm or less) of inorganic lead present in personal care products do not represent a significant risk to the public, including especially children.
2. Thus, lowering the allowable level of lead below 10 ppm will have zero net public health or environmental benefit, but would likely result in significant negative economic impacts on several industries important to the State of Vermont.

**Final Observations and important points to consider:**

Based on US GS data, the typical concentrations of lead in soils across the state of Vermont, which includes soils used in gardens, are likely 3-10 or more times higher than the current l0 ppm standard for lead in cosmetics.

a. United States Geologic Society estimates that the average ‘natural’ (geogenic) lead level in Vermonters soils is approximately 37 ppm, with some soil test samples as high as 69 ppm (these are samples NOT contaminated from any human activities). This is typical of natural, background levels of lead in soils

across the world.  Indeed, it would be almost impossible to find sources of naturally derived clays to use in cosmetics that contained less than 10 ppm lead. USGS data demonstrated that nearly all soils contain more than 10 ppm, with ‘average values typically ranging from 10-60 ppm.

b. Decades of research has demonstrated that the most important source of environmental exposures to lead comes from the extensive contamination of residential soils and indoor house dust from the use of lead-based paint, which can generate levels of lead in soil that greatly exceed the geogenic levels of lead in soil.
c. According to Childhood Lead Poisoning | Vermont Department of Health (healthvermont.gov), about 70% of homes in VT were built before 1978, the year lead in house paint was banned.

Thank you --  I would be happy to answer any questions you may have.