



Balancing Prevention and Uncertainty: Minnesota Case Examples

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Case Example 1: Water Gremlin

Lead and Trichloroethylene (TCE)

Water Gremlin Background

- Producer of fishing sinkers, battery terminals, and ammunition components since 1949
- Processes include
 - Die-Casting
 - Hot melt molding
 - Hot melt extrusion
 - Coating
- Worker population
 - Ages 19–70 years
 - 93% male
 - Languages spoken include English, Spanish, Hmong, Somali, and Karen

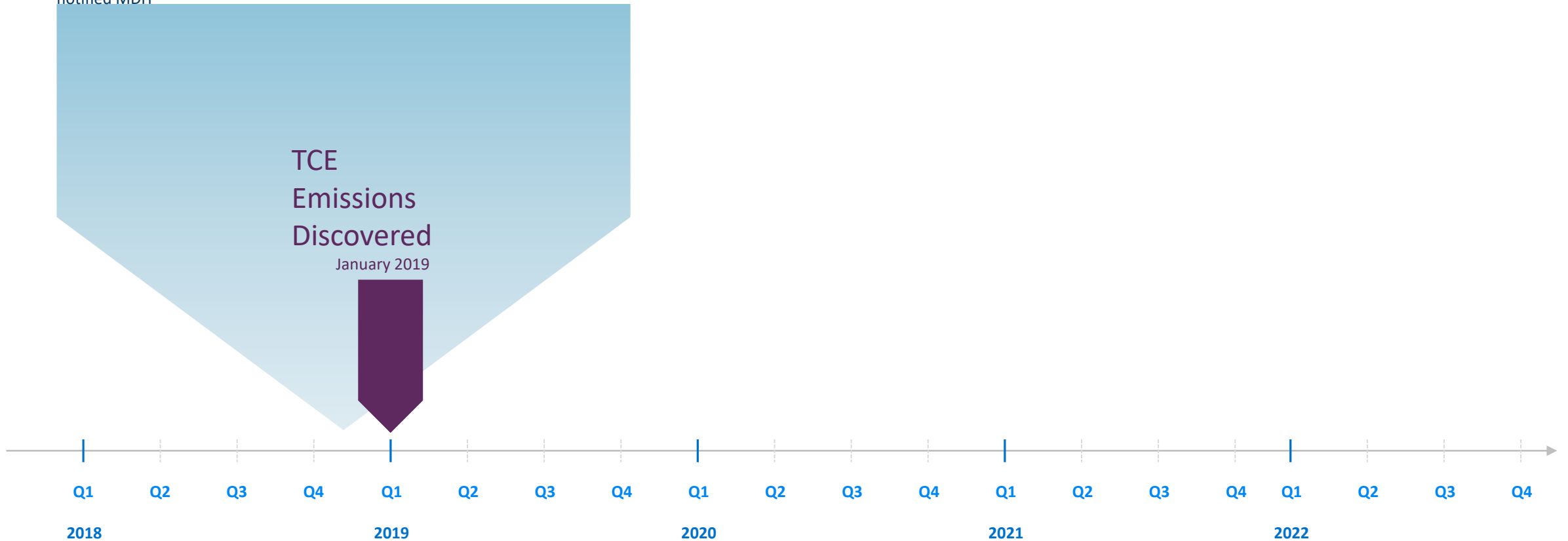


Worker preparing materials for die casting

Intervention Timeline

Lead Case Identification

St. Paul-Ramsey County Public Health identified take-home lead cases and notified MDH



Lead Data

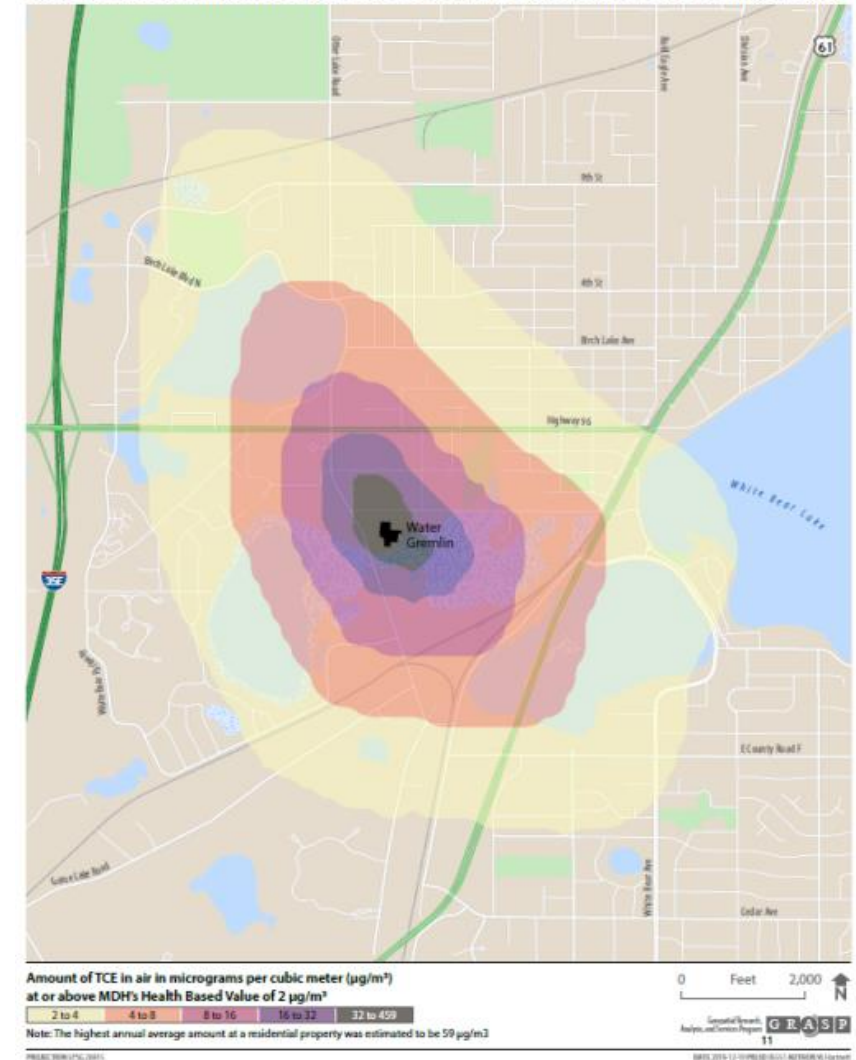
- 12 children with blood lead levels (BLLs) $\geq 5\text{mcg/dL}$
- Environmental investigations eliminated other lead sources
- Household members worked at Water Gremlin
 - Links to Water Gremlin confirmed through dust wipe samples of cars, entryways used by workers, and shoes worn to work



TCE Data

- TCE history at Water Gremlin:
 - Used since ~1992; use expanded in 2000
 - Multiple equipment breakdowns contributed to air permit violations
 - Violations disclosed to MPCA in late 2018
 - TCE use discontinued following temporary facility shutdown in 2019
- MPCA modeled potential community exposure to TCE
- Likelihood of health effects at the 2018 modeled concentrations (2-59 $\mu\text{g}/\text{m}^3$) is low. Potential effects include:
 - Increased risk of certain cancers (kidney, and possibly liver and non-Hodgkin's lymphoma)
 - Non-cancer effects to the immune system and kidney
 - Risk of heart defects during fetal development

2018 Estimated Annual Average Amount of TCE in Air from the Water Gremlin Facility



Immediate Interventions

Lead

- Department of Labor and Industry (DLI) issued a temporary order stopping operations
- DLI and Minnesota Department of Health (MDH) filed a complaint in District Court; Water Gremlin created a *public health nuisance*
- Court required Water Gremlin to provide testing and cleanup of worker vehicles and residences, conduct worker training in appropriate languages, make major worksite modifications, and hire a third-party for monitoring
- Public health outreach activities and BLL testing

TCE

- Water Gremlin and Minnesota Pollution Control Agency (MPCA) signed stipulation agreement
- Company switched to trans-1,2-dichloroethylene (t-DCE)
- Increased air and site monitoring activities
- Public health assessment and outreach activities
- In July 2022, new air permit proposed

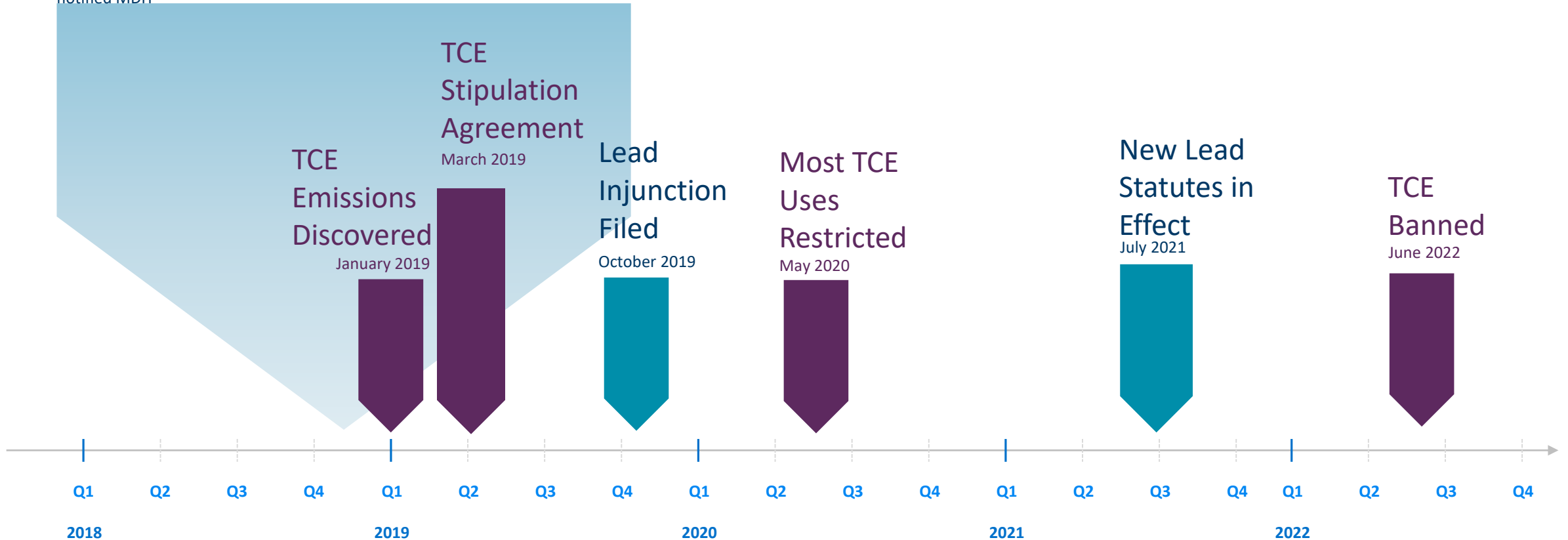
Post-Intervention Lead Data

- 3 additional children with BLLs ≥ 5 mcg/dL linked to Water Gremlin
- 287 workers' cars were tested
 - 219 (89%) cars had at least one initial dust wipe result >40 mcg/ft²
 - Highest initial lead level in a car was 42,000 mcg/ft²
- 180 workers received BLL tests in both 2019 and 2021
 - BLLs decreased significantly ($p < 0.0001$)
 - Average decrease in BLL was 4.2 mcg/dL (95% CI 3.6, 4.8).

Intervention Timeline

Lead Case Identification

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Uncertainties

Lead

- BLL testing recommended but not required for children
- Extent of take-home lead discovered when Ramsey County voluntarily investigated BLLs 5–14.9mcg/dL

TCE

- Individual exposures to TCE over time unknown
- Breathing 20 $\mu\text{g}/\text{m}^3$ TCE continuously for a lifetime is expected to result in no more than 1 additional cancer in 10,000 exposed people
 - Unlikely to detect measurable increases in cancer above background rates

Policy Changes

- Threshold for required lead risk assessments changed from 15mcg/dL to 5mcg/dL
- Risk assessments now required for children with elevated blood lead levels up to age 18 years
 - Previously capped at 6 years old
- If another location outside of the home is the original source of lead exposure, the assessing agency may now order the responsible person of that location to perform lead hazard reduction and remediate the conditions that allowed the lead hazard to migrate from the source location to the home
- White Bear Area Neighborhood Concerned Citizens Group Ban TCE Act
 - Restricted TCE for most uses in May 2020
 - Ban now in effect
 - Replacement chemicals must be less toxic than TCE



Case Example 2: Skin Lightening Products

Mercury

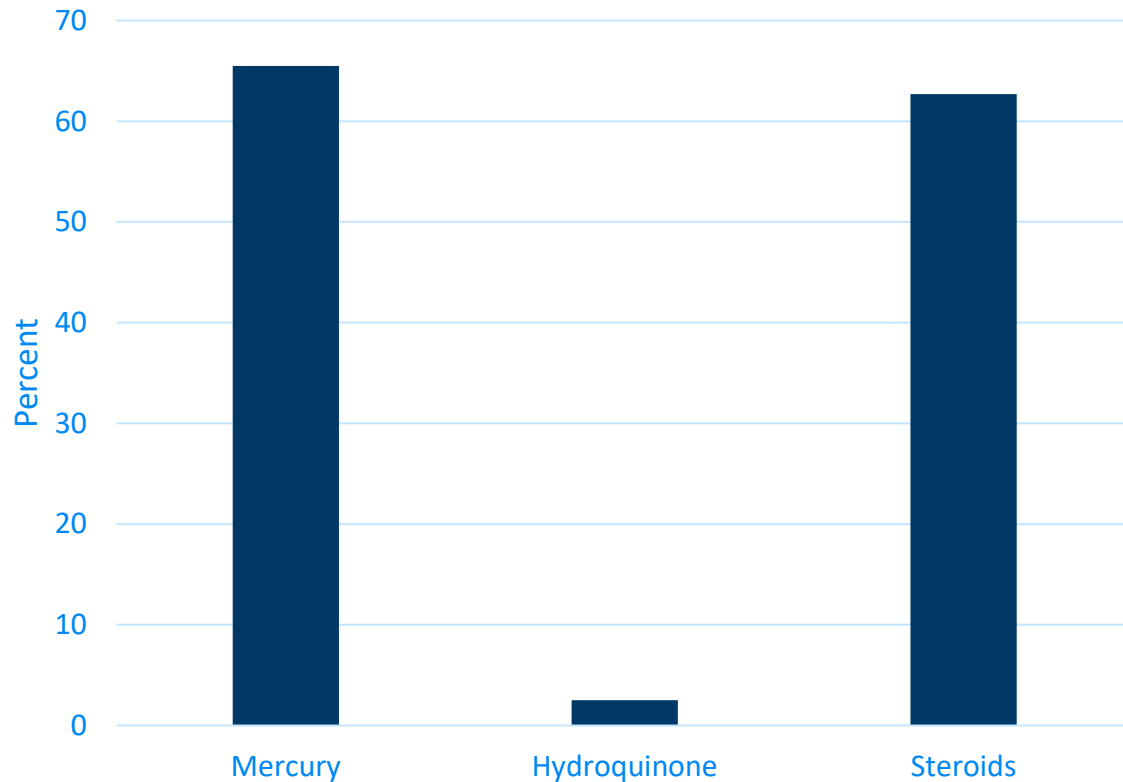
- Skin lightening products containing mercury above 1ppm not legal for sale in Minnesota
- Mercury exposure is not reportable in Minnesota
- Key informant interviews revealed Somali women use skin lightening products during pregnancy and breastfeeding
 - Products applied to the entire body twice daily
- Focus groups of college students reveal familial and community relationships, generational differences, and American and contemporary Korean (K-pop) culture influence Hmong American beauty ideals

Biomonitoring Data

- MN FEET was Biomonitoring Study of pregnant women from Asian, East African, Latino and White communities
 - Average urine mercury levels higher for women who had used a skin lightening cream in the past
 - 9 of 396 women had urine mercury $> 5\text{mcg/L}$
 - Women with elevated urine mercury levels were Hmong and Latina



Percent Products from Minnesota Markets Containing Contaminants



Meyyong Seaweed Super Whitening – Extra Whitening & Face Lift
 Mercury: 30,000 ppm
 Steroids: Betamethasone, Betamethasone 17-Valerate



Rice Milk Whitening Cream
 Mercury: 7,470 – 35,000 ppm
 Steroids: Betamethasone, Betamethasone 17-Valerate



CCM Cream
 Mercury: 3,940 – 13,000 ppm
 Steroids: Betamethasone, Betamethasone 17-Valerate, Clobetasol

Policy Changes

- One-time grant program established for skin lightening grant outreach and education
- 2022 bills proposed continuation of grant program and making mercury exposure reportable in Minnesota
- Clinical urine mercury projects

Skin Lightening Products Public Awareness and Education Grant

The purpose of the Skin Lightening Products Public Awareness and Education Grant is to increase public awareness and education on the health dangers associated with using skin lightening products that contain mercury that are manufactured in other countries and brought into the United States and sold illegally online or in stores.

\$200,000
available funding



Funding available
\$200,000: 50% to non-profits
and 50% to local public health

Informational conference call

- Monday, October 7, 2019
- 9:00-10:00 am
- Access the meeting by calling 888-742-5095, pin number 4893644698 followed by #.

Application deadline
November 21, 2019

More information
Public Awareness and Education Grant
<https://www.health.state.mn.us/communities/environment/skin/grant.html>

Further Reading

- Water Gremlin Public Health Assessment Draft for Public Comment
 - <https://www.health.state.mn.us/communities/environment/hazardous/sites/watergremlininc.html>
- Yendell SJ, Janowiak D, Yannarely J, Rezania Z, Haugen KMB, Yang D, Kelly J, Huff D, and Surdo P. Tackling the Lead Gremlins: A Response to Take-Home Lead Exposure in a Minnesota industrial facility, 2019. Accepted for publication.
- MN Feet Study: Community Report
 - <https://www.health.state.mn.us/communities/environment/biomonitoring/docs/mnfeetcommreporten.pdf>
- Skin Lightening Products Found to Contain Mercury, Hydroquinone, and/or Steroids
 - <https://www.health.state.mn.us/communities/environment/skin/docs/testedprds.pdf>
- Adawe A and Oberg C. Skin-Lightening Practices and Mercury Exposure in the Somali Community. Minnesota Medicine. July 2013: 48–49.
- Keefe S, Abdulle A, Holzer K, Mohammed N, Schneider B, Vorderbruggen A, and Xiong M. Hmong College Student Perceptions and Experiences with Mercury Containing Skin Lightening Products in St. Paul Minnesota. Hmong Studies Journal. 2018. 19(2).

Thank You!

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