MDH Speaks: “Toxic Beauty” by Lisa Strong (13:34)

Anna Strain: “So that was three very different, very interesting talks about Infectious Diseases and how the Public Health Department plays one of its responsibilities; to help limit the spread of infectious diseases. You've got three different, personal perspectives on how we work to limit Infectious Diseases. We're now going to turn to how our Environmental Lab helps to maintain a safe environment for people of Minnesota.

“First up from our Environmental Health Lab, is Lisa Strong. Lisa Strong has lived in Minneapolis since 1989. She has an urban garden on her 6000 square foot city plot that has a large pollinator garden grove of six types of fruit trees, and nine beds that she uses to grow food. She's been working for the Public Health Laboratory for nine years, and her talk is called ‘Toxic Beauty.’

“Welcome, Lisa!”

[applause]

Lisa Strong: “Hello. In case you don't know, 6000 square feet is tiny. It's 125 feet long and 40 feet wide, it just sounded like a lot when she said 6000. [audience laughs] So, my name is Lisa Strong and I'm a Research Scientist at the Minnesota Department of Public Health.

“I begin my workday by putting on booties and a lab coat, making sure my glasses are on, and going into the clean room. Then I go to the computer, and I pull up the list of samples that I need to analyze that day. We look at urine from people from all over the state of Minnesota, looking for background levels of all kinds of metals. Sometimes when I go to the list, there's a special sample up there at the top of the list. Getting results on this sample is my number one target for the day, because as I put on my gloves and get to work, we have a new mystery.

“Somewhere in Minnesota, there is a young woman. She's the mother of three school aged children. She's married and successful in her career. The family of five eats together, laughs together. She leads a normal, healthy, happy life. But recently, something changed. A few weeks ago, she started to snap at her children and pick fights with her husband. She became forgetful. She started to become uncooperative at work in a way that alarmed her coworkers. Her hands started to tremble and go numb with that pins and needles feeling. It was when she started to fall while walking, that her husband rushed her to the hospital.

“At the hospital, the doctor struggled to find the source of her symptoms. Was she having a stroke? Was she in septic shock from a mysterious infection? Had she been poisoned or drugged? The doctors call Minnesota Poison Control for advice. Erin Dorf, a fellow with the Minnesota Pollution Control Agency, answers the call. She works with the physicians to try and find narrowed down the cause of the symptoms. She rushes samples of her urine to us at the Minnesota Department of Health so that we can look for the source of symptoms.

Lisa Strong (con't): “At the Department of Health, we have two teams of specialists: we have Infectious Disease and we have Biological and Emerging Contaminants. We are able to test for 14 high consequence infectious agents and toxins, plus over one thousand common and illicit drugs, plastics, herbicides, pesticides and toxic metals. Any of which might be causing her problems.

“And so now I'm looking at her urine. I'm holding the squat orange cap cup that I know you've been asked to pee into. [audience laughs] We see many of these cups, but this one has something in it which, if we can find it, can help her physicians heal her. In my part of the laboratory, we're really good at finding metals. We take the urine, and we dilute it with some chemicals that help components separate, and then we inject it into an inductively coupled plasma mass spectrometer. In this instrument, the sample burns at fifteen thousand degrees, and the freed atoms are separated and counted. So while my coworkers are looking for those thousands of other things, I get a hit. And it's a bittersweet moment, because we have an answer, but it's not one that we really want to hear.

“She has over 180 micrograms per liter mercury in her urine. And there we have it. She has dangerously high levels of mercury in her body. Most often we don't see any mercury, up to about five micrograms per liter doesn't really present much of a problem. Now her symptoms make sense.

“We have long known about the dangers of mercury poisoning. In the 1600’s, every person of distinction wore a beautiful, felted fur hat. The felt was made by immersing fur and mercury in acid, and that roughened the fibers, so they matted together to form a sturdy fabric. The dangers of habitually handling mercury this way was immortalized by Lewis Carroll in his ‘Mad Hatter’ character. Workers lost their memory and reason, their limbs twitched and trembled, they drooled. Eventually, they went completely insane.

“But our question is, where did she come into contact with mercury? Armed with our results, we call MDH epidemiologists Jessica Nelson, Sheila Amenumey, and Fathi Ahmed. They gathered together their team of interventions experts, which includes toxic reductions experts Michael Xiong and John Gullickson. They gather up an interpreter and then go visit the home. At the home they talk with the family to help them understand what is happening and look for the source of the mercury. Other family members get their urine taken so that they can be screened for high background levels of mercury. Michael and John pull out their lumex mercury vapor analyzer. This is an air sniffer that looks like a canister vacuum cleaner, and it also works like a vacuum cleaner. It sucks up air and sounds an alarm when mercury is detected. The family is interviewed, and the woman's routine is revealed, from when she gets up in the morning until she goes to bed at night. Every night she brushes her hair and she puts beauty cream on her hands, arms, chest, neck and face.

“And now they hear it. The lumex is alarming wildly next to the innocent looking jar of beauty cream on the bedside table. Long before mercury was ever used in the industry, it was valued as a component of cinnabar, which is a bright red powdered cosmetic made from sulfur and mercury. We know that people decorated themselves with cinnabar as many as 5000 years ago, because Neolithic skeletons are stained red from the huge quantities of cinnabar that people used. But this cream isn't red, so what is going on?

Lisa Strong (con't): “We're all familiar with the profound and often detrimental impacts of beauty standards that are imposed upon women. Ever shifting attitudes regarding height, weight, proportion, hair color and skin tone all influence a woman's perceived attractiveness and desirability, which in turn impacts her opportunities in life. The pressure to conform to beauty standards continues today. Vidya Rao, who's a famous Hindustani singer, remembers billboards that were impossible to avoid as a child. On one side, a dark-skinned woman is sad and alone, and on the other side, the same woman armed with a jar of skin whitening cream that has worked its magic; she's dressed in a business suit and she's embracing her paramour. The message is clear: she has achieved success in both her professional and her personal life, thanks to lighter skin.

“Now, the thing is, mercury actually works. It binds to the cells in the skin, and it poisons the melanin, the part of the skin that gets dark, and the result is lighter skin. Of course, this special cream isn't available commercially because it would never pass safety testing, but because there's demand, sellers go into local drugstores, buy common creams, mix in dangerously large amounts of mercury, and then repackage the product for sale at local markets. You cannot taste, smell, or feel mercury. There's no way to know that it is there. But the mercury doesn't stay on the surface of the skin. It's absorbed into the bloodstream and travels to every organ in the body poisoning, liver, kidneys, and brain. The jar of cream is also releasing mercury vapor into the air for the entire family to breathe. mercury is rubbed off onto clothing, bedding, and towels, and it spreads to everybody's clothing in the laundry. This is particularly concerning for the woman's young children who are still growing. mercury poisoning puts their development at risk so contaminated areas are identified, and source products are offered to be removed for safe disposal. Residents learn what is happening, why it is happening, and how cleaning up the area can help restore health and prevent others from becoming ill. MDH Health communicators go into the affected community so that others can learn about the dangers and choose safer ways for themselves. Fortunately, once people learn the dangers, most make the decision that their health is a priority. Over a period of months, all affected people are offered monitoring of their urine mercury levels to make sure they're getting better. But sometimes people decide that the perceived benefits outweigh the risks and dangerous products make their way back into the home and then things start going in the other direction. In that case, the team will visit the home again or even multiple times. They visit and talk as many times as necessary until everyone is restored to background levels, or the family decides that enough has been done. Also, fortunately, this form of mercury leaves the body rapidly, but damage done may be permanent, so acting fast is important.

“Here in Minnesota, we are building routine programs to stop this chain of events before anyone is irreparably harmed. We have a new pilot program to screen preschool age children for mercury and other chemicals and intervene when high levels are found. We're also working to expand a program to screen pregnant women. But these are spot checks and do not reach everyone right now.

Lisa Strong (con't): “What I want you to see is that at every decision point, a laboratory analyst and a laboratory test are critical, accurately identifying the source of the issue and removing it from the environment is really important, as is monitoring people over time to make sure that the treatment is working. Here in Minnesota, we prevent neurological damage and developmental disabilities. We increase the health and productivity of our residents while simultaneously decreasing our social services and health care costs. We need to continue to fully fund our public health initiatives so that we can continue this important and excellent work until it is no longer required.

“Thank you.”

[applause]