

Episode 3, Part 2: Out of the Factory

Trace Material: Stories from the Plastics Age

[Music - Rainbow Road]

Burgess Brown:

We know that PVC production boomed in the mid-twentieth century, and that it was a much more pervasive product than just that white plastic pipe we're all familiar with.

Ava Robinson:

It's in much more than records and tires, or in the pipes and siding in our homes. And it isn't only factory workers making PVC who are at risk. It's all of us.

Burgess:

From Parsons Healthy Materials Lab at the New School. This is Trace Material: Stories from the Plastics Age.

[Music - Rainbow Road]

Ava:

In part one of this episode, we talked a lot about PVC. Specifically, about PVC in the factory setting. Billy Baggett and Jerry Markowitz told the story of what happened when workers at certain plants got sick and how the companies who employed them reacted.

Burgess:

But obviously PVC doesn't just exist in factories. And for a quick recap, PVC stands for Poly Vinyl Chloride, and it's made from long chains of polymerized vinyl chloride monomers. So while PVC the product is being created in factories, vinyl chloride monomers—in the form of gas—are released.

Ava:

And it's that gaseous form of vinyl chloride that is known to cause adverse health effects in humans.

Burgess:

We focused the first part of this story on the factory, because that's where the connections between vinyl chloride and diseases like cancer were first understood. The factory workers were quite literally on the frontline. But, well, you probably see where this is going.

Ava:

There's a whole second half to the story of PVC, and it lies beyond the factory walls. To help us tell this story, we're going to be speaking with Jerry and Billy again, and to Dr. Sarah Evans from Mount Sinai.

Burgess:

But first, we've got to talk about something I don't have much experience with... hairspray.

[Retro Commercial Music]

"Her head has the grace of a delicate flower, that nature has dressed..."

"Rainy, humid weather. That's the real test of a hairspray."

"How will she keep her hair and hairstyle beautiful?"

"Nothing equals its special way of holding firmly. Millions of women have been using it exclusively for years."

[Retro Commercial Music]

Ava:

Hairspray is about as iconic as beauty products can get. Gravity-defying mid-century hairstyles like the bouffant and the beehive couldn't have existed without it. I mean, there was a whole musical written about it.

[Music - "No it's hairspray..."]

Burgess:

And before those Italian studies from the mid-70's that we talked about last time found vinyl chloride to be harmful, the gaseous form was used widely as an aerosol in hairspray.

Ava:

While researching this episode, I watched dozens of commercials from the 60s and 70s for hairspray, and I know if I was a young woman back then, I never would have thought it was dangerous.

Burgess:

No one would have. Including the companies that were producing it. As Jerry tells it, when industry found out how harmful vinyl chloride could be, hairspray was one of the things they were most concerned about.

Jerry:

The fact that workers are getting sick is one kind of problem, but workers getting sick can be covered by workers' compensation. There's a, you know, a limit to how much damage can be done to the company, but vinyl chloride monomer was not only used in PVC plastic. It was also used as an aerosol for a variety of products, including insecticides, but most prominently in terms of danger to the public, as a hairspray. People working in hair salons were at risk and the people who were getting their hair done in hair salons were obviously at risk. And that's what the big concern was.

Ava:

Okay, the point Jerry just made is an important one. Legally, you would think that industry was more responsible for its workers than it was for the public. And in a way that's true, but because of that companies had insurance that would cover incidents with their employees. But, if a consumer got sick or injured from a product a company put out, the fiscal damages could be much higher.

Burgess:

So, in part one of this story we talked about these European studies that shook the industry's confidence in their product. After the American companies got that information from the Italians, they did some studies of their own.

Jerry:

They wanted to do research to reassure the public that there was no danger from the use of both PVC plastic, as well as these aerosols. Well, they couldn't reassure the public about the aerosols and they stopped selling them. Without telling why they stopped selling them.

Ava:

So their studies confirmed that vinyl chloride could be dangerous, but that's exactly what was in all those cans of hairspray women across the nation were using every day.

Billy:

The women using hairspray that contains almost pure vinyl chloride or high percentages of vinyl chloride... it was known that industrial workers were not exposed at as high of levels as these women were, spraying it in their face.

Burgess:

As Billy said, the levels that might have been in hair salons were likely higher than what industrial workers were being exposed to, and getting serious illnesses from.

Billy:

Some of the big companies, they're going, "Whoa, we're not making money off this." Some of them didn't even know they were selling it there. They want to make pipe. They want to make chairs, PVC, not hairspray. It was an incidental part of their market. And they say, you know, whereas we're protected by the workers' compensation laws against the suits, by our own employees... a company continuing to sell vinyl chloride for propellant applications faces potentially unlimited liability to the entire US population.

Ava:

"Unlimited liability to the entire US population" was not a risk worth taking for these companies. So vinyl chloride was removed from hairspray and other aerosols without comment after industry confirmed studies about exactly how harmful it was.

Jerry:

PVC plastic was a burgeoning industry in the United States in the early 1970s. I think in 1969 US industry sold 1.2 billion pounds of PVC plastic. Five or six years later, they doubled that. They were selling 2.4 billion pounds. This is a real moneymaker for chemical companies in the United States. The major danger was that consumers would feel like this new product, PVC plastic, which was everywhere, would end up harming them. And so they had to control what the potential damage was. And in terms of consumers getting sick, consumers could sue the companies for, you know, millions, tens of millions of dollars, I mean if a 40, 50 year old woman who had been using hairspray died of exposure to vinyl chloride monomer. I mean, that is a multi-million dollar lawsuit. And there were potentially thousands, tens of thousands, hundreds of thousands of people who were exposed to vinyl chloride monomer, and that would be a disaster for the industry.

Burgess:

But that disaster never happened. Because although angiosarcoma in workers became public knowledge, the possible connection for consumers didn't. Not until it was found in the MCA papers Billy collected. So it's possible that people using hairspray did get sick, and were diagnosed with cancers

associated with vinyl chloride, but they wouldn't have known what was causing it. Unlike workers, their exposure levels weren't being documented. It would be a very difficult thing to prove legally.

Jerry:

Doctors might just diagnose liver cancer and not ascribe it to... I mean, women would have to remember that 20, 30 years before they had used hairspray. Somebody would have to remember that there was vinyl chloride monomer in hairspray, which of course was not advertised at the time. So it's, it's a tough connection to make, I think.

Ava:

That sounds like an impossible connection to make, actually. The information about vinyl chloride and the possible risks associated with it when it was used as an aerosol weren't public until the 1990s. Vinyl chloride was pulled out of hairspray in the 1970s. Imagine if you were trying to prove that hairspray had made a family member sick who had since passed away. Would you have their twenty-year old drug store receipts? Probably not.

Burgess:

But even after pulling vinyl chloride out of aerosols, industry continued to fund studies. The goal of these studies was not just to understand the effects of vinyl chloride, but also to make sure the public continued to have a positive perception of PVC.

Jerry:

The idea here is the US government comes up with a study that shows that something is dangerous. And industry funds contrary studies, or hires individuals to put their names to a purely industry study, or they put out a public relations material that questions the accuracy of the federal study. The goal there is not to discredit the studies completely and say something is necessarily safe, but just to create doubt so that federal regulation will be stymied. And that has been extremely successful up until the present day. I think that that is an extremely effective way of countering the ability of the federal government to act.

Ava:

The studies aren't saying, vinyl chloride is perfectly safe. They're simply saying it *might* be safe, and that is enough to create a culture of uncertainty around it.

Burgess:

Essentially, industry's method for dealing with possible public health issues was working out for them. They were able to pay small settlements to workers and their families—like Elaine Ross—and were still able to control public perception of PVC.

Ava:

According to Billy, it wasn't just funding studies that cast doubt. They also used ad campaigns and various forms of pro-chemical messages.

Burgess:

The goal was to make chemicals and chemical products seem safe and everyday. Billy even told us about a sponsored children's rap about cool chemicals.

Billy:

It was children rapping about chemicals, you know, [sings] and benzene ring is so hip, ba ba ba and flip flip flip, you know.

Ava:

Okay so in an environment like the one Billy and Jerry have painted for us, with unknown chemicals in everyday products and chemical companies creating doubt about their safety with tactics I would have considered outlandish, how can we as consumers make sure we're buying safe products?

Burgess:

I think we've both struggled with that, especially lately. The more we learn about these chemicals, the more wary we are of products that used to feel safe—just because everyone used them.

Ava:

Yeah. I've been doing the basic things like using a stainless steel water bottle instead of a plastic one, carrying a tote bag, and switching to reusable silicone bags instead of plastic baggies, but those are just the things I know about. I'm sure there's much more I don't.

Burgess:

And even we do know, it's not always easy to make the switch. Like, I was looking for an air mattress a few weeks ago while we were researching for this episode, so I REALLY had PVC on the brain. And I looked through a bunch of lists of the top recommended air mattresses and all of them were made of PVC.

Ava:

At the end of our conversation with Jerry, a man who has spent much of his adult life immersed in this story, we asked him how he traverses these questions, and what he hoped would happen now.

Jerry:

I think there are a couple of things that need to be done. One is you need scientists who are often reluctant to enter the public fray, to speak out more. And to call out the ways that their science is being distorted. But I think equally important is you need mobilized populations. You need people who care about their communities to demand that legitimate science be done, be supported by government or private foundations, and that the results be publicized so that there is respect for the truth about the potential hazards of a variety of different toxins.

Burgess:

PVC has come to dominate the market because it's easy to use, it seems safe, and it's cheap. But when we asked Billy if he had any final words on the subject, it was that idea that he wanted to call into question.

Billy:

It's not cheap. The scariest thing about PVC... Oh man, I'm afraid to get into this too much, but it's clear that it does horrible things to developing children... and it's not just vinyl.

[Music]

Ava:

So in the first part of this episode, Dr. Sarah Evans told us about the possible health impacts the vinyl chloride monomer has in the factory setting, but as we know, those monomers don't just stay in the factories. And they aren't only released intentionally like in the case of aerosols, they are also released anytime PVC is burned.

Burgess:

So think about a house catching on fire in suburban America. It has PVC pipe and vinyl siding, the whole neighborhood could be exposed to vinyl chloride monomers. Or, imagine you live close to a PVC factory, the same monomers Dan Ross breathed in could be floating around your neighborhood. Here's Dr. Evans again.

Sarah Evans:

Historically, factories that manufacture PVC have been localized to communities of color and impoverished communities. And that's a real legacy that we have here in this country. Those communities have been disproportionately burdened by exposure. You know I mentioned that during PVC production, vinyl chloride, as well as dioxins and other chemicals contaminate the air and the water around those communities. And we've seen higher rates of cancers and illnesses in the people who live in those communities who tend to be Black and Brown communities. And this has been really a prime example of environmental racism in this country where Black and Brown individuals are disproportionately burdened with harmful chemical exposures. But we also see, you know, beyond communities that live close to factories like this, that Black and Brown communities have higher exposures to many of the chemicals that are associated with PVC plastics.

Burgess:

And factories aren't the only way people can be exposed to the dangers of PVC.

Sarah:

Everyone is impacted by what happens when PVC is disposed of, and I think about the massive amount of food and product packaging that gets discarded every day. And those materials then leach chemicals into landfills and into groundwater. And they also release dioxins when they're burned and dioxins are other known cancer causing substances. It's actually a really big problem in the disposal of medical waste, much of which contains PVC, because those products need to be incinerated... We can't really overlook the complete life cycle of PVC and its potential health impacts.

Ava:

So, the gaseous vinyl chloride isn't the only way PVC can be harmful to humans. One of the additives which are used to make PVC flexible and transform it into a shower curtain, lunchbox, or pipe are called phthalates. That's somehow spelled P-H-T-H-A-L-A-T-E-S. And they're often the cause of PVC's health effects in consumers.

Sarah:

Phthalates are one of those hormone disrupting chemicals. And they're classified actually as possible human carcinogens. They're also linked to hormone disruption, impaired reproductive development, learning and behavior problems, and even the increased risk of asthma and allergy.

Ava:

Oof, okay. And these phthalates are pretty impossible to avoid.

Sarah:

So to focus on the risks of exposure through the everyday use of consumer products, which is a situation that, that most of us experience, we know that the products that are made with PVC release chemicals that get into our body. So those additives that I mentioned are not tightly bound to the PVC and they leach out into our homes and our foods. And we know from studies that the Centers for Disease Control and Prevention conduct every other year called the National Health and Nutrition Examination Survey or NHANES for short, that phthalate chemicals, for example, are measured in the blood of almost all Americans that are tested. And so we also know that PVC is likely a major source of this exposure. Studies of people who live in homes that have vinyl flooring, for example, show higher levels of phthalates in the dust of those homes, as well as in the urine of children that reside in those homes. So suggesting that PVC in those building products is actually getting into the bodies of people who live there.

Burgess:

So, according to Dr. Evans, PVC is a widely used plastic, and it can be harmful to human health in a variety of ways. Even people like me, who don't work in a factory, and don't live near one, might be exposed to related chemicals just through everyday life.

Ava:

It's so difficult to wrap your head around how widespread these health effects are. And it's also really hard to figure out what chemicals are in products we use every day.

Sarah:

Yeah, so we have a big problem with transparency in products in this country. So not everything comes with an ingredients label, unfortunately, and that's, we really see that for things like building products and even toys and things that are intended for children. So it can be really challenging. You know, I encourage people to look all over a product and see if it has a number three recycling symbol, or if it says vinyl, or if it says PVC, or polyvinyl chloride. Often it won't because it doesn't have to. And so that might require pursuing the manufacturer, or contacting the manufacturer to try to find out what the product is made of. There are some great advocacy organizations out there that do third-party testing and have created lists and guides so that you can look for a safer alternative and know which products contain PVC, which products are also contaminated with phthalates or lead or cadmium.

Ava:

I don't think many of us have time to do that level of research into a plastic toy. This information is out there, but it's really hard to find. Most of us want to believe that any toy that's being marketed to a

toddler, who puts everything into their mouth, has been vetted by some sort of federal agency. But that's just not the case.

Burgess:

It's that culture of doubt Jerry talked about. You don't *know* that a toy is harmful, no one is telling you it is, so you wouldn't assume that it might be made of a chemical you've never heard of that has serious health effects. Who would assume that?

Ava:

But, if hearing this story has taught me anything, it's that there are probably many more chemical dangers hiding in stacks of paperwork that haven't been discovered yet.

Burgess:

Alright, so that's a lot of scary information about toxics in our environment and our bodies. And while it may seem like an impossible task to regulate, thankfully, Jerry, at least, doesn't see it that way.

Jerry:

Well I guess I, I am old-fashioned enough... and I'm old enough to believe that the truth will set us free. That the more information we have, the better we are able to deal with the issues that are confronting us and the industry version of that is: be a better consumer. But my version of that, and I think David's version of that is we need to hold industry responsible and we need to ensure that the government holds industry responsible so that we as consumers and we as the public, are not confronted with impossible choices. That for me is the most important part of doing this work. That you give individuals an opportunity to harness their power as people who vote, people who are part of communities, to really change the kind of society that has been handed to us.

Ava:

Our next episode is going to dig into these ideas, and hear about how powerful and organized community can be.

Burgess:

We're going to talk more about what happens when we throw all that plastic we buy away. Where does it go? What happens to it? And how is it affecting communities on the frontline?

Ava:

To learn about all of that, make sure you join us next time on Trace Material.

[Music]

Credits:

Hi, this is Olivia Hamilton from the HML Team. Thanks for listening! *Trace Material* is a project of Parsons Healthy Materials Lab at the New School. It is produced by Ava Robinson and Burgess Brown. Our project director is Alison Mears and our research assistant is me, Olivia Hamilton.

Thank you to Jerry Markowitz, Billy Baggett, and Dr. Sarah Evans for lending their voices, experiences and expertise to this episode.

You can find transparent information and vetted lists of healthier building materials on our website, healthymaterialslab.org. The Environmental Working Group website, ewg.org, is also a great resource. Dr. Evans has shared some excellent resources from Mt. Sinai on phthalates. You can find those as well as other info on PVC on this episode's page at healthymaterialslab.org/podcast. And be sure to give us a follow on instagram at [@healthymaterialslab](https://www.instagram.com/healthymaterialslab).

Trace Material is made possible by funding from the National Endowment for the Humanities and support from Friends of Healthier Materials. Our theme music is "Rainbow Road" by Cardioid. Additional music from Blue Dot Sessions.