

Erin Welsh

"In early 1996, Les had a cough that he just couldn't shake. He didn't think much of it. It had been a hard, cold winter and he just figured he had a touch of bronchitis. But Gayla Benefield wasn't so sure. She suggested that Les go over to see Dr. Whitehouse in Spokane. Whitehouse had already treated several people from Libby. Finally as much to get Gayla off his back as anything, Les made an appointment. And he and Norita got into their '89 Dodge and took the five hour drive over to Spokane one spring day in 1996. Les was a little embarrassed about the whole thing when he got there. He told the nurse, 'I don't feel sick'. Alan Whitehouse put him at ease right away. He looked over Les' information and said, 'So you're from Libby, eh?' 'Yes.' 'Well I've got a pretty good idea why you're here.' 'You do?' 'Yep. Take your shirt off. We're gonna do a chest X-ray and a breathing test.'

About 45 minutes later Whitehouse came back into the room and leaned on the examining table and said, 'Well you've got active asbestosis.' No hemming and hawing. Les recalled the doctor telling him he had between 5-10 years to live. Les was stunned. He really didn't know what asbestosis was but he knew he didn't feel bad enough to be dying. He hadn't worked at that mine for 35 years. How do you comprehend something like that? He took the inhaler and walked out to the front desk and said send me a bill. And he and Norita got in the car and started home. And he didn't say anything at all until they had gotten almost halfway home. He pulled over to the side of the road and stopped the car and shook his head. 'What's the matter?' Norita said. 'By god, you know, I believe I just got a death sentence.'"

TPWKY

(This Podcast Will Kill You intro theme)

Erin Allmann Updyke

Wow.

Erin Welsh

Yeah. So that really sad snippet of a story, really just a tiny little piece, is adapted from a book called 'An Air That Kills' by Andrew Schneider and David McCumber. And Les in the story is a real person, his name was Les Gramstad and he was an outspoken activist and advocate for everyone affected by asbestos related diseases. And he died on January 21, 2007 at his home in Libby, Montana from mesothelioma.

Erin Allmann Updyke

Wow.

Erin Welsh

And you'll hear more about Libby, Montana later on in the episode.

Erin Allmann Updyke

Oh I'm sure we will. Wow.

Erin Welsh

Yeah.

Erin Allmann Updyke

Ugh.

Erin Welsh

I know. Hi, I'm Erin Welsh.

Erin Allmann Updyke

And I'm Erin Allmann Updyke.

Erin Welsh

And this is This Podcast Will Kill You.

Erin Allmann Updyke

And today we're talking about asbestos.

Erin Welsh

Yeah. This is a topic that we've been wanting to do for a while but I feel like we've been intimidated by just how much there is to cover and wanting to do it justice which is impossible to do really.

Erin Allmann Updyke: It really is. Yep.

Erin Welsh: Yeah.

Erin Allmann Updyke: We're going to fall short in some regards but we're going to learn a lot together today.

Erin Welsh: Yeah.

Erin Allmann Updyke: Yeah.

Erin Welsh: It's going to be a very interesting episode. I'm really looking forward to understanding what the heck asbestos does to your body because I really don't know.

Erin Allmann Updyke: Ooh and I really want to understand the history because I feel like it is going to be massive and a lot of drama.

Erin Welsh: Infuriating.

Erin Allmann Updyke: Yeah.

Erin Welsh: Yeah. Really soul crushing for sure.

Erin Allmann Updyke: Yeah. Well...

Erin Welsh: Well on that note-

Erin Allmann Updyke: Oh those happy notes.

Erin Welsh: Yeah. Shall we, is it quarantini time?

Erin Allmann Updyke: It definitely is.

Erin Welsh: What are we drinking this week?

Erin Allmann Updyke: This week we're drinking Unquenchable.

Erin Welsh: Yeah. We're calling it Unquenchable because asbestos means unquenchable in Greek. It's like one of the words that lent its meaning to asbestos.

Erin Allmann Updyke: Love that.

Erin Welsh: Yeah.

Erin Allmann Updyke: And what is in Unquenchable?

Erin Welsh: Well we wanted to do something that resembled asbestos fibers. And I think the closest thing was cotton candy.

Erin Allmann Updyke

Cotton candy. You'll never look at it the same.

Erin Welsh

No. And it's cotton candy plus Prosecco and raspberry and some lime juice. And yeah, it's-

Erin Allmann Updyke

Surprisingly tasty?

Erin Welsh

Yeah.

Erin Allmann Updyke

For a cotton candy containing drink.

Erin Welsh

Yeah, I think that is an accurate representation of my feelings about this drink.

Erin Allmann Updyke

We will post the full recipe for that quarantini as well as our non-alcoholic placeborita on our website [thispodcastwillkillyou.com](http://thispodcastwillkillyou.com) and our social media channels.

Erin Welsh

We certainly will. On our website you can find all sorts of things such as transcripts for each and every one of our episodes, you can find links to [bookshop.org](http://bookshop.org) and Goodreads list, you can find links to our music by Bloodmobile, to Patreon, to merch, to probably other things that are out there. Check it out, there's a lot to discover, [thispodcastwillkillyou.com](http://thispodcastwillkillyou.com).

Erin Allmann Updyke

Loved it. Beautifully done, Erin. Any other business that we must urgently attend to?

Erin Welsh

I really don't think so. I think the most urgent business is to get straight into the meat of this episode. So please, after this break, can you tell me about the biology of asbestos?

Erin Allmann Updyke

Sure can try.

TPWKY

(transition theme)

Erin Allmann Updyke

In literally the very first lines of the very first paper that I opened about asbestos, I learned things that I didn't know. So I was starting from a place of knowing absolutely nothing, clearly, about asbestos. Because as it turns out, asbestos is not one thing.

Erin Welsh

That was news to me as well.

Erin Allmann Updyke

News to me.

Erin Welsh

It's an industry term.

Erin Allmann Updyke

Right. So I understood asbestos from a public health perspective prior to this exclusively. And from a public health perspective, I understood asbestos as like a fibrous material that was used a lot in construction, that when inhaled can cause disease. And that's not entirely wrong but as we'll see, it's not the whole story.

Erin Welsh

Right.

Erin Allmann Updyke

Historically, and this is not I think stepping on your toes because it's just a very brief intro, Erin. But historically asbestos has been used for so many different things and I know Erin, you're going to get into that in more detail.

Erin Welsh	It's absurd how many things.
Erin Allmann Updyke	The wicked witch's broom, did you know that?
Erin Welsh	I did know that.
Erin Allmann Updyke	Covering playgrounds instead of grass.
Erin Welsh	Uh-huh.
Erin Allmann Updyke	It's incredibly heat resistant and fire resistant and resistant to corrosion. So it was used for fireproof suits, piping, insulation, housing insulation, roofing, flooring, cement, brake pads, like literally everything.
Erin Welsh	Except for the fact that I think was is not the appropriate tense.
Erin Allmann Updyke	Correct.
Erin Welsh	It still is used in a very disturbing number of things in the US and around the world. Although many countries have banned it but that's getting way ahead of ourselves.
Erin Allmann Updyke	We'll get there eventually, but it's not one fibrous thing. So what is it? at its core asbestos is a mineral compound or multiple types of mineral compounds that are made of silicon and oxygen that naturally form into fibers, like a fibrous substance. Kind of looks like cotton candy. Six of these specific minerals are grouped together under this umbrella of asbestos and they are in many countries either banned now or at least highly regulated. However there exist hundreds of other minerals that also naturally exist in a very similar fibrous state And in many cases have also been shown to be carcinogenic to one degree or another but are not regulated as asbestos because they at least historically haven't had a large amount of commercial usage. And like you mentioned Erin, asbestos is really a commercial or a regulatory definition. One example of this is erionite, I think that's how you pronounce it, which is also a fibrous mineral and is a known and recognized human carcinogen. But it is not regulated in the same way as asbestos. It is not considered under this asbestos umbrella. However mineralogically it's a very similar compound.
Erin Welsh	That's interesting in terms of regulation and protection and what determines safe levels of exposure, which is already a total mess or at least historically has been such an infuriating mess where it's like oh we don't want to use this new high powered microscope because that will find more asbestos than we thought was there using our outdated 30 year old techniques. Anyway.
Erin Allmann Updyke	I love that we're already getting a glimpse into the history, Erin.
Erin Welsh	I don't even talk about the whole like protocols for assessing asbestos exposure but it is a part of it that is... Ugh. Anyway.
Erin Allmann Updyke	But in general, what we call asbestos can be broken down into two subgroups. There is serpentine asbestos which includes chrysotile and that is by far the most widely used form of asbestos. This form of asbestos makes these longer curly fibers that are very, very versatile in their uses. If you look at them under like a scanning electron microscope, they look like these long curly tubes that if you cut them in cross section kind of roll up like a scroll almost.

Erin Welsh

Yeah.

Erin Allmann Updyke

And then there's the grouping of amphibole asbestos which includes five different forms, actinolite, tremolite, anthophyllite, crocidolite and amosite. And apologies if I pronounced any of those incorrectly. But all of these fibers tend to be more straight and brittle and are usually described as kind of needle-like. They're still used a lot in commercial situations but definitely less than chrysotile. But the thing is that even within these two kind of broad mineralogic classifications, serpentine and amphiboles, these kind of mineralogic classifications, there are a lot of other fibrous materials that are not regulated as asbestos even within those two categories. So it's a lot and I find it very interesting.

Erin Welsh

Yeah.

Erin Allmann Updyke

Yep. The major determinants of the toxicity of any of these forms of asbestos is the fiber dimension itself, like how wide, how long, etc, and the bio persistence, how long do these fibers just hang out either in the environment or in our lungs, which we'll get to. And then of course dose and duration and things like that. In general, the amphibole types of asbestos have been shown to be more pathenogenic and more carcinogenic than the chrysotiles. However those are used much more frequently, right? And don't get me wrong, all forms of asbestos as well as many other similar mineral compounds are pathenogenic and carcinogenic.

Erin Welsh

Right.

Erin Allmann Updyke

So anyone who says they're not is not telling the truth. Okay. I can tell by your face that we'll get there.

Erin Welsh

We will.

Erin Allmann Updyke

So let's talk about what the actual health effects of asbestos are, shall we? At its core, the reason or the mechanism by which asbestos causes disease is that we inhale these teeny tiny little fibers into our lungs. These fibers, even though when you have a big clump it might look like cotton candy, the actual individual fibers themselves are like microns or tenths of microns long. We're talking very, very small, invisible to the naked eye when you breathe them in. We're inhaling them into our lungs and then they simply stay there. Some like the chrysotile are longer, so they might get stuck in places in our lungs that are a little bit higher up or we might even maybe sometimes be able to breathe some back out. But many including the very short or needle-like varieties can penetrate very deeply into our lungs and then stay there. So that's part of why the pathogenicity is the actual bio persistence. How deep are these getting into our lungs, which the fiber length and size is going to play into, and then how long do they stay there?

Erin Welsh

Okay. So when you say how long do they stay there, does our immune system play a role at all in breaking them down or isolating them or anything like that? Or do they just stay there forever?

Erin Allmann Updyke

Yeah, that's a great question. Our immune system plays a really big role but as we'll see it's largely just in causing inflammation from these just staying there.

Erin Welsh

Okay.

Erin Allmann Updyke

Yeah.

Erin Welsh	So it's like I know there's something there but I can't do anything about it and I'm angry and inflamed.
Erin Allmann Updyke	One thing that can happen is our immune system can form these what are called asbestos bodies where macrophages and things kind of try to wall off these little asbestos fibers. But again, that can just be a nidus for more chronic inflammation.
Erin Welsh	Okay.
Erin Allmann Updyke	So let's get into the different types of diseases that we see with asbestos because spoilers, if you didn't realize this, it's not just one. Asbestos can cause two different classifications of diseases, cancers and non cancers. And these are not mutually exclusive and many times the noncancerous form of asbestos can develop into cancer later in life. But in terms of the non cancerous disease, the major one that we see with asbestos is called asbestosis. Pretty aptly named. And this comes from usually long standing exposure to asbestos. I really tried to get a handle on quantifying this, like how much asbestos do you really need to be exposed to? I could not get a good answer for this, Erin.
Erin Welsh	I'm not surprised really.
Erin Allmann Updyke	Yeah. I'm not either once I really started thinking about it but it just was disappointing I think.
Erin Welsh	So if you couldn't get info on how much asbestos causes asbestosis, what are the diagnostic criteria for asbestosis?
Erin Allmann Updyke	Yeah, let's talk about what it actually looks like, shall we?
Erin Welsh	Yeah.
Erin Allmann Updyke	So asbestosis looks and is really very similar to a pretty generic disease called interstitial pulmonary fibrosis. This is a lot of inflammation in the lungs, a lot of scarring. And this type of scarring happens kind of inbetween areas in our lungs, like inbetween the alveoli and inbetween places where your oxygen is supposed to be diffusing into your bloodstream. So what this results in is decreased capacity for diffusion, you can't get air to actually cross from the lungs into the bloodstream. So this is what is called a restrictive lung disease. It's the opposite of what we were talking about with bronchiolitis which is obstructive, right, where you can get air in but you can't get it out. Here your air is not getting in as well, or at least it's not diffusing the way that it is supposed to.
Erin Welsh	Okay.
Erin Allmann Updyke	So people have shortness of breath, often a pretty dry cough. On an X-ray or a CT scan you can often see this pattern called honeycombing because the spaces between little air sacs and things get thickened, so you can see those scarred, inflamed areas more prominently.
Erin Welsh	Gotcha.

Erin Allmann Updyke

None of this is specific to asbestos or asbestosis. But so you asked how do you actually then make this diagnosis? It would be seeing all of these symptoms and then asking have you ever worked around asbestos? Have you ever had any exposure to asbestos that you know of? And someone who had that history, you might think this could be caused by asbestos. And then if you were to do a biopsy, you would actually be able to see the asbestos fibers existing still in the lungs and asbestos bodies like I mentioned in addition to all of these inflammatory changes.

Erin Welsh

Okay. How often is that biopsy done and how is the treatment different if it's asbestosis vs another cause of this pulmonary fibrosis?

Erin Allmann Updyke

Great question. So the biopsy can be done via like a lavage, so you don't have to necessarily puncture lung tissue.

Erin Welsh

Okay.

Erin Allmann Updyke

It doesn't have to go from the outside. You can do it through a bronchoscopy where you're putting like a tube down into the lungs, looking there, and then putting fluid in and kind of washing the area.

Erin Welsh

Okay.

Erin Allmann Updyke

And we do that for a lot of different things. But so you would be able to see asbestos fibers and asbestos bodies in that what's called a bronchoalveolar lavage. And you could potentially take additional biopsies too if you needed to. In terms of treatment, it doesn't differ than any other treatment for interstitial pulmonary fibrosis or a lot of other kinds of restrictive lung disease really. And that is that we don't have very good treatment for it.

Erin Welsh

Yeah. Okay.

Erin Allmann Updyke

Yeah, yeah. So that is the kind of non cancerous, major non cancerous disease that we see with asbestos, asbestosis. But of course asbestos is a known carcinogen, carcinogen being substances that are known to cause cancer. And the biggest buzzword which you heard in our firsthand account and most people probably associate with asbestos is mesothelioma. Do you remember Erin, the like legal company Infomercials about mesothelioma?

Erin Welsh

Oh yeah.

Erin Allmann Updyke

I feel like I don't see those anymore which is interesting.

Erin Welsh

I feel like I just watch TV on subscription services so that's maybe part of it for me.

Erin Allmann Updyke

I just pay for the cheap ones where I still have ads on my Hulu. But yeah, the reason that this association is so strong in so many of our brains is because the vast, vast majority of all cases of mesothelioma are caused by asbestos. In fact one of the papers that I read said that the only other generally recognized causes of mesothelioma are erionite exposure, which again that's a very similar compound but not-

Erin Welsh

Asbestos adjacent.

Erin Allmann Updyke

Exactly. And that's from like endemic exposure in places where that's naturally occurring.

Erin Welsh

Okay.

Erin Allmann Updyke

Ionizing radiation, when people were exposed to very specific types of contrast. And chest injuries. So without asbestos, mesothelioma would be an incredibly rare cancer. But what actually is it? What is this?

Erin Welsh

Yeah, yeah.

Erin Allmann Updyke

Mesothelioma is a cancer of linings. It is a cancer of the lining of our lungs, called the pleura or the lining of our abdomen, called the peritoneum. Or in some rare cases, lining of our heart or the lining of the testes, which is called the tunica vaginalis. So it's a cancer of the serosa, that's a word that we actually just talked about in our lupus episode. Specifically within our serosa there are cells in this lining that are called mesothelial cells. And so cancers are usually very boring and called after the type of cell that they come from. So that's what a mesothelioma is. The mesothelial cells in our serosa, our pleura, our peritoneum, they're what make our insides slippery and allow them to move well across each other. The serosa lines both for example our lungs and our chest wall and allows your lung to move freely against the chest wall without any irritation, inflammation, etc. So that is what a mesothelioma is, it's a cancer of the lining of something and most often our lungs.

Erin Welsh

Okay. In the cases of asbestos associated mesothelioma, it tends to be the pleura?

Erin Allmann Updyke

Very often it's the pleura. It certainly can be the peritoneum as well.

Erin Welsh

Okay.

Erin Allmann Updyke

Because while inhalation is the most common route of exposure, you can also be exposed via water, you can be exposed via soil, and so this isn't something that's limited to our lungs.

Erin Welsh

Right, okay.

Erin Allmann Updyke

But mesothelioma is a generic term that could mean mesothelioma of the pleura, of the lungs, or of the peritoneum of your abdomen.

Erin Welsh

Right.

Erin Allmann Updyke

So it's a kind of a little bit more generic than just lungs.

Erin Welsh

Yeah.

Erin Allmann Updyke

So what we see with mesothelioma of the pleura of the lungs is that people are going to present with a lot of difficulty breathing, as you can imagine, a lot of chest pain, especially pain with deep inhalation or chest pain that gets worse with inhalation. And when you look at imaging like an X-ray or a CT, you see a lot of fluid built up around the lungs. This is called a pleural effusion. If instead of being in the lungs, it's the peritoneum, the abdomen, you see similar things just in the abdomen, abdominal pain. Your abdomen is a lot more elastic than your chest wall, so you might see a lot of distension of the abdomen because of this fluid. And we call fluid in the abdomen ascites.



And then depending on how bad it gets or how much tumor burden there is, you can end up with compression of things like bowels that could lead to a bowel obstruction. And because this is a cancer, this is tumor that we're talking about, but it's developing on this structure that's very thin and kind of vast, right, like it lines the entirety of our chest wall or the entirety of our abdomen. The amount of spread and invasion that we tend to see with mesothelioma by the time someone is symptomatic and therefore diagnosed is really extensive.

Erin Welsh

How does asbestos exposure lead to mesothelioma?

Erin Allmann Updyke

Excellent question. That's the key question, isn't it?

Erin Welsh

Yeah.

Erin Allmann Updyke

As per usual part of my answer is going to be that we don't fully know.

Erin Welsh

Of course, has to be.

Erin Allmann Updyke

Has to be. But we do have kind of a lot of ideas. These are fibers that are penetrating our lungs and causing a lot of irritation, they're causing a lot of inflammation. So we know that this can lead to things like asbestosis like we already talked about, that's just sort of inflammation and irritation. Part of this inflammation itself can put you at risk for cancers of various forms. But in the case of asbestos, it also seems to have specific carcinogenic properties as well. And these are actually more varied than you might think. One thing that asbestos fibers actually seem to do is disrupt the mitotic spindles of cells, like physically break the mitotic spindles, which are necessary for the process of mitosis or cell division. So it's thought that this physical disruption can result in chromosomal damage during mitosis while our cells are trying to replicate.

Erin Welsh

Okay. So it's just like putting a wrench in the whole cell replication process.

Erin Allmann Updyke

That's one of the ways, yeah. Asbestos also seems to induce a lot of reactive oxygen species formation that additionally can cause further DNA damage, which can then put you at risk for cancers. We also see in general deregulated cell growth because of disruption of growth factor genes. So there's a lot of kind of more specific cancer-causing genetic changes that we see after exposure to asbestos that we still don't fully understand.

Erin Welsh

Gotcha.

Erin Allmann Updyke

One thing that's interesting is that mesotheliomas specifically, especially in the lungs, tend to occur first on what's called the parietal surface, that's the body surface of that lining rather than the lung surface of that lining. Since again, there's like two of these linings. So it's thought that it's the asbestos fibers literally sticking out of the lung and scraping along that body wall side that's causing that repeated inflammation and those other changes that we talked about.

Erin Welsh

Oh my god, that is horrible.

Erin Allmann Updyke

Horrific, I know. I know. And mesothelioma is a horrible cancer. Median survival has been and continues to be 9-12 months after diagnosis.

Erin Welsh

Wow.

Erin Allmann Updyke

But that's not all because it never is. Because while we may associate asbestos with mesothelioma in our mind, asbestos also can cause and does cause any and every other type of lung cancer as well. This means squamous cell lung cancer, adenocarcinoma, large cell, small cell, as well as laryngeal cancer, ovarian cancer, possibly increases your risk of colorectal cancer and other cancers. In fact, it's estimated that asbestos exposure causes six times more lung cancer as in other types of lung cancer than it does mesothelioma. And it's also estimated that lung cancer deaths are likely twice as great as mesothelioma deaths in relation to asbestos exposure specifically because even though mesothelioma is horrific, it still remains very rare thankfully.

Erin Welsh

Okay. Are there associations with certain types of asbestos and certain outcomes of asbestosis or certain types of lung cancers vs mesothelioma? Stuff like that.

Erin Allmann Updyke

It's a really good question. I found a paper that I'll link to that tried to really quantify cancer risks for both lung cancers and mesothelioma by fiber size. And the truth is that we just don't have enough data to actually like... The end result of that was that no, not really. What it showed was that the chrysotile forms, which again are more common, do seem to be slightly less carcinogenic than the other amphibole forms. But both of them are associated with significantly increased risks of mesothelioma and other lung cancers.

Erin Welsh

Gotcha, okay.

Erin Allmann Updyke

Yeah. And there are a lot of different ways aside from just fiber size that people have tried to kind of really quantify the risk of asbestos exposure or the risks of various cancers after exposure. But there isn't an easy clear single answer. Like I mentioned, it depends on fiber type, it depends on the persistence and the size, but it also depends on dose, on duration, and then individual factors as well, things like smoke or tobacco exposure at the same time or in the same person even further increases the risk of cancers because of additional damage to the lungs. And then we all have our own individual baseline cancer risk or genetic cancer risk that plays into this as well. There are papers that have numbers that exist but they're not really great and I don't think that they provide all that much context.

Erin Welsh

Yeah.

Erin Allmann Updyke

The other thing about lung cancer and especially mesothelioma is that the latent period is incredibly long after exposure.

Erin Welsh

Why is it so long? Or is it just that we are not good at picking up 1:1 causes of cancers in other types of exposures I guess? Does that make sense?

Erin Allmann Updyke

Like is this abnormally long or do we just not know the exposure for other cancers to know the latency period?

Erin Welsh

Right, right.

Erin Allmann Updyke

That's a really good question. Yeah, that's a really good question. I don't have a good answer to that. So I don't know if it is abnormally long or if it's just that we know this latency period. I hadn't thought about that actually. I don't have an answer but it's a really good question. But it is about 30-40 years or more by the way.

Erin Welsh

Yeah.

Erin Allmann Updyke

For anyone wondering how long long is.

Erin Welsh

It's so long.

Erin Allmann Updyke

It's very long. Which means that we are certainly not out of the woods in terms of new diagnosis of asbestos related diseases, even though efforts have been made to reduce asbestos exposures. So yeah, I mean that's asbestos.

Erin Welsh

Maybe this is a question more for current events but are there any medications or therapies that can reduce the damage caused by or reduce the asbestos burden in people's bodies who have been exposed?

Erin Allmann Updyke

Not that I was able to find or read about.

Erin Welsh

Okay.

Erin Allmann Updyke

Yeah. Yeah, it's a bummer.

Erin Welsh

How do you know if you've been exposed to asbestos? If you don't know, right. Like are there tests that can show before you develop asbestosis or before you develop one of these lung cancers and do a biopsy, are there screenings that can say yes, you have asbestos in your lungs? Or is it just that you're seeking answers to a health problem that you've observed?

Erin Allmann Updyke

All of us have been exposed to asbestos. All of us likely have asbestos in our lungs to one degree or another because asbestos is and has been so common. There are not screening protocols that are universal. Some countries have some screening guidelines in place for specific occupations and things like that if you had very high levels of exposure to asbestos because of your occupational exposure, but none of that has been very well studied and so it's not very well kind of fleshed out. There's a lot of interest in this especially because in recent years we do have guidelines for general lung cancer screening as it relates to tobacco smoking. So we know that screening for lung cancer in people who have a history of a long term smoke exposure can reduce mortality because we can catch cancers earlier, right, that's the point of screening.

Erin Welsh

Yeah.

Erin Allmann Updyke

That data doesn't exist yet for asbestos. Could it in the future? Maybe but it doesn't right now.

Erin Welsh

Okay.

Erin Allmann Updyke

Yeah.

Erin Welsh

Okay. So we may not have good numbers on how many asbestos fibers of this type or that type will cause cancer or asbestosis or whatever but I feel like for a really long time, it was like oh you have to be a an employee at a asbestos mine for 35 years in order to get any one of these things and that's the only time that you're really at risk. But that is not the case.

Erin Allmann Updyke

It's definitely not the case. Like I said, there's going to be a lot of individual variation in this. But because we have all been exposed to asbestos and some people to a greater degree than others, in theory any exposure to asbestos can put you at risk for mesothelioma and other cancers. Some papers tried to put an estimate not necessarily on exposure but just on the amount of asbestos say remaining in your lungs and the increased risk of cancer and what they estimated was, for example, a twofold increase in risk of lung cancer if you were to do one of those lavages of the lungs and find between 5-15 asbestos bodies, that's that inflammatory reaction, per milliliter of fluid. And that's a relatively low number.

Erin Welsh

Yeah.

Erin Allmann Updyke

But that's kind of at least the number that this paper cited.

Erin Welsh

Okay. Yeah, it's just hard to get...

Erin Allmann Updyke

A real sense of it, yeah.

Erin Welsh

Yes.

Erin Allmann Updyke

And it is going to vary so much person to person because not everyone who has worked even in say asbestos mines or worked with asbestos for their entire life is going to develop cancer. And then there are people who have been exposed maybe to just asbestos that was in their home that they didn't even know about and then end up with mesothelioma or lung cancer as a result of it.

Erin Welsh

Yeah.

Erin Allmann Updyke

So yeah, that's asbestos in a nutshell. A small one. So Erin, I cannot wait to hear everything about how we came to find this, what do you call it, mineral? I guess these minerals, these commercial designation minerals. How we decided to start using them in all of these different ways, how we decided that this wasn't a great idea. I want to know all of it.

Erin Welsh

Yeah. There is a lot to this story and so let's just jump to it right after this break.

TPWKY

(transition theme)

Erin Welsh

Like I said, the history of asbestos is unsurprisingly huge. It spans thousands of years, encompasses the entire globe, whole books have been written about the legal aspects of asbestos litigation or moments in asbestos history, not to mention the health effects of asbestos and how we learned about them. So having to distill this entire history down into like an hour and a half, hour whatever podcast, it's a little daunting because I know that I won't be able to do this entire story justice. And justice is certainly deserved, especially for those who have suffered and continue to suffer from the corporate negligence that makes up a horrifyingly large portion of the history of asbestos.

So what I'm going to do in the history section is present the history of asbestos in basically two parts. The first as a little tour, not comprehensive by any means, through the ancient history of asbestos up until about like the 1930s, 1940s or so which is when the health effects really began to be widely recognized. In the second part, I want to take a closer look at why asbestos has earned this notoriety as an industrial killer by taking us through the story of Libby, Montana, which is often described as one of the worst environmental disasters in the history of the United States.

Erin Allmann Updyke: Have we talked about Libby, Montana in other episodes?

Erin Welsh: I don't think so. So we've talked about in our arsenic episode, I think we made reference to the Anaconda Mine which is in Montana and then of course in Rocky Mountain spotted fever, we talked a lot about the Bitterroot Valley.

Erin Allmann Updyke: Right.

Erin Welsh: But I don't think we've talked about Libby, Montana.

Erin Allmann Updyke: I don't know why it sounds familiar, like I definitely don't know anything about Montana.

Erin Welsh: I think you know more than you think.

Erin Allmann Updyke: Nope. Less. Less than you think.

Erin Welsh: Well by the end of this history section, you'll know more. How about that? But let's start back at the beginning, back to when humans first began using asbestos, which turns out to be a lot longer ago than I realized. There is evidence of asbestos used in pottery in parts of Africa and in Finland dating back 4000 years.

Erin Allmann Updyke: Wow.

Erin Welsh: And homes in eastern Finland from this time were found to contain asbestos packed into the crevices between logs, presumably for insulation.

Erin Allmann Updyke: Wow!

Erin Welsh: In Ancient Rome, the wicks in the lamps used by the vestal virgins were made of asbestos so that they would burn forever as long as there was oil in the lamp.

Erin Allmann Updyke: Oh my gosh, because it's fire retardant.

Erin Welsh: Uh-huh.

Erin Allmann Updyke: What? That's so cool.

Erin Welsh: Isn't that cool? And like we said at the very beginning of the episode, the word asbestos comes from the Greek meaning unquenchable or inextinguishable. The vestal virgins by the way, which I've heard about them but I didn't know what they were, they were called that because they were priestesses of Vesta, the Roman goddess of the hearth. And so the constantly burning flame was especially symbolic for like this ever burning hearth flame fire.

Erin Allmann Updyke: I can't tell you how much I now want an asbestos candle.

Erin Welsh: Oh my god. I don't think that's a great idea.

Erin Allmann Updyke: It's not.

Erin Welsh: No.

Erin Allmann Updyke: But doesn't it sound cool?

Erin Welsh: I mean asbestos seems to hold such like magical power for so much of history.

Erin Allmann Updyke: Yeah. Wow.

Erin Welsh: And I can see it, it is like an incredibly impressive mineral.

Erin Allmann Updyke: It is, yeah.

Erin Welsh: Yeah. Charlemagne, who lived in the 8th and 9th centuries, allegedly had a tablecloth woven with asbestos and he would use it as like a party trick. So you spill wine or meat sauce or I don't know, beets on it, and then you would toss it into the fire to clean it. And he would just then pull it out unscathed.

Erin Allmann Updyke: Okay, that's a cool party trick.

Erin Welsh: Very cool party trick. Yep. There are also references to asbestos napkins that could be similarly cleansed by fire which hints at another earlier name for asbestos, amiantos, meaning undefiled.

Erin Allmann Updyke: Wow.

Erin Welsh: The uses of asbestos from ancient times to the 1700s range from like the sort of useful such as in body armor, fireproof coats, shirts, gloves, sleeve ruffles. I love that because like sleeve ruffles must have been so prone to catching on fire.

Erin Allmann Updyke: Yeah, getting caught on fire. They're like we can't get rid of the ruffle, we have to make it fireproof.

Erin Welsh: Thinking outside the box. And also my favorite is burial shrouds so that the ashes could be kept separate.

Erin Allmann Updyke: Wow.

Erin Welsh: But then there were the more inventive but not necessarily practical uses such as the quote unquote "book of eternity" which is a book that people wanted to make whose pages were made of asbestos, so it couldn't be destroyed by fire.

Erin Allmann Updyke: Okay.

Erin Welsh: To things that were purely just for show like Benjamin Franklin's purse made of asbestos fiber, which you can see if you go to the Natural History Museum in London.

Erin Allmann Updyke: Wow, okay.

Erin Welsh: And I've seen a picture of it and I have to say it is a hideous little thing. It's not good looking, right. And there was something about oh he didn't want to burn a hole in his pocket with the money, so he like wanted to save money or something to that effect.

Erin Allmann Updyke Oh that's ridiculous.

Erin Welsh Yeah, super ridiculous. But throughout history, asbestos maintained global popularity with mines all over the world. Despite this global popularity and the existence of mines everywhere, there seems to have been a bit of confusion over where asbestos came from. And somehow people either forgot that it came from rocks or the alternative explanation was just too good, it was just too magical and too fun, which was that asbestos grew as hair on fire resistant salamanders.

Erin Allmann Updyke Like in Frozen II.

Erin Welsh Is there a fire resistant salamander?

Erin Allmann Updyke Yeah, there's a little salamander who like his butt, he goes boof and then he catches on fire and then runs around. I've seen it too many times.

Erin Welsh It's exactly that. That's amazing because I had no idea but apparently salamanders had this reputation for being fireproof. The etymology of salamander is not fully resolved but it may come from the Persian meaning fire within or from the old French legendary fiery beast.

Erin Allmann Updyke Oh my gosh, that's fascinating.

Erin Welsh And so the idea behind this, or at least one of the proposed ideas as to why it has its reputation, is that some species live in damp logs. And so if you toss that log onto a fire, it may burn for a bit before it gets too hot and the salamander would then run out and it's like whoa, this thing just came from the fire, it's fireproof.

Erin Allmann Updyke Got it. Cool it.

Erin Welsh I mean maybe, who knows? But yeah, this was a very common myth. Not just the fire resistant salamander but that hair grew on these fire resistant salamanders and that's where asbestos came from.

Erin Allmann Updyke That's so interesting because you just mine it.

Erin Welsh You just mine it. I don't know.

Erin Allmann Updyke Someone was clearly mining it way back then.

Erin Welsh I think it's just like it is a more fun explanation.

Erin Allmann Updyke Yeah, yeah.

Erin Welsh People called asbestos salamander wool or salamander cotton for a long time.

Erin Allmann Updyke Okay.

Erin Welsh  
And yeah, people did try to dispel this myth such as Marco Polo, who around 1300 wrote about an asbestos mine that he saw. Quote: "Towards the northern boundary of this province is a mountain with a vein from which is produced salamander. You must understand that this is not a beast as is commonly asserted but its real nature is such as I will now describe. It is a well known fact that by nature no beast or other animal can live in fire." And so he's calling asbestos salamander which kind of is also confusing.

Erin Allmann Updyke  
Right.

Erin Welsh  
But he's like no, it's not an animal, it is a thing that you find in the mountain.

Erin Allmann Updyke  
Right. It's in this rock, it's just a thing in the rocks, you can take it out of the rocks, it's not alive.

Erin Welsh  
Yeah, yeah. And then he goes on to explain the mining process and how you turn it into fibers and how you can burn those fibers and it comes out unscathed or whatever. And then he concludes with quote: "The account I have given you of the salamander is the truth and all the other accounts that are put about are lies and fables." Strong words. Endquote. But even after this, even after these strong words by Marco Polo, the nature of asbestos remained a mystery until about the 1600s. And the salamander imagery was linked with asbestos for quite some time. Later on certain asbestos processing companies used it on their logos and I'll try to find one to post on social media.

Erin Allmann Updyke  
Oh interesting.

Erin Welsh  
Anyway, the 1700s and the 1800s really saw a huge increase in the popularity of asbestos, again with applications ranging from the ridiculous, like the so-called human salamanders who dressed in asbestos clothes and roasted steaks by hand and did other types of tricks like that while standing in a fire. I don't know how that would have worked, I'm not convinced that it did.

Erin Allmann Updyke  
You would still get really hot. I don't... Oh humanity.

Erin Welsh  
Well you know, things that people were writing about in the 1700s...

Erin Allmann Updyke  
Yeah.

Erin Welsh  
Don't believe everything you read, period, especially from the 1700s. Just kidding. Then there were more practical inventions. One of the earliest successful asbestos businesses was founded by Giovanni Aldini, nephew of Luigi Galvani, if you remember from our electricity-

Erin Allmann Updyke  
Galvanism.

Erin Welsh  
Yeah, exactly. He did the frog leg experiments.

Erin Allmann Updyke  
Was he the one who did the frog leg and then came to the exact wrong conclusion?

Erin Welsh  
Erin, that was like two years ago.

Erin Allmann Updyke  
So sorry.

Erin Welsh  
I have no idea. A year ago? It's impossible to say.



Erin Allmann Updyke

Anyways, moving on.

Erin Welsh

Anyways. Aldini made fireproof apparel specifically for firefighters, just kind of a cool idea, if only he knew. Not long after fireproof theater curtains came onto the market and were credited with saving like quite a few lives. But asbestos really started its upward climb in the Industrial Revolution, used in steam engines and roofing material, combined with cement to make fireproof ships and electrical panels, in vinyl asbestos tile, brake linings, insulating material. The possibilities seemed truly endless and most scholars point towards the 1860s and the 1870s as the beginning of the modern asbestos industry.

As more and more products began to include asbestos and as demand for those products grew, asbestos mines and processing facilities kept popping up to provide all the asbestos the world market wanted. People loved asbestos. The 1939 World's Fair featured a booth just overflowing, like it had asbestos everywhere, like actual asbestos, and a giant asbestos man. It seemed like a magical substance, there was no end to how it could be used. And over the first half of the 1900s or so, it found its way not just in construction or insulating materials like asphalt, paint, plastics, plasters, clays, fireproofing materials, clutch facings, it was especially important during WWI and WWII, but it also began to make an appearance more and more in everyday life to the everyday consumer. Let me just list a few of these items here.

Erin Allmann Updyke

Oh dear.

Erin Welsh

As a filtering agent for wine, beer, gin, pharmaceutical products, asbestos was even used as a cigarette filter during the 1950s.

Erin Allmann Updyke

Yeah. I read that one and I went ooh, ooh, ooh.

Erin Welsh

Yeah. In the 1950s which like we already knew that it was no good.

Erin Allmann Updyke

Yeah.

Erin Welsh

Gas mask filters, sewing threads, surgical threads, surgical dressings, blankets, mail bags, ironing boards, toasters, play sand, fake snow, toothpaste, baby powders. All in all around 3000-4000 commercial products. So you mentioned the Wicked Witch of the West's broom, it wasn't just the wicked witch's broom.

Erin Allmann Updyke

Oh dear.

Erin Welsh

It was also the fake snow used in the movie, likely asbestos.

Erin Allmann Updyke

Whoa.

Erin Welsh

And the use of asbestos in the Wizard of Oz, that was hardly a one off. Next time you watch It's a Wonderful Life or actually many Christmas movies from that era, keep in mind that the fake snow swirling around everyone on set was often a form of asbestos.

Erin Allmann Updyke

I have to say it's just so interesting that something, and I think this goes back to the fact that like asbestos is not one thing, right, but that something with one name can be so many different things.

Erin Welsh: Yeah.

Erin Allmann Updyke: Right?

Erin Welsh: Right. And so that is something that like I didn't mention at the top of this history but I am lumping asbestos all together.

Erin Allmann Updyke: Right. I mean that's how it is lumped.

Erin Welsh: It is how it is lumped.

Erin Allmann Updyke: Yeah.

Erin Welsh: Yeah. And in that regard, it makes sense that it was used in thousands of commercial products and had so many different uses.

Erin Allmann Updyke: Yeah, it's so interesting.

Erin Welsh: And yeah. And so given that it was so widely used from the fake snow to toothpaste to filtering agents, surely no one suspected that it could be bad for you because how could it still be used to such a degree?

Erin Allmann Updyke: I mean I've heard too many of your history sections to think that that's true for a second.

Erin Welsh: You know, I'm just trying to make everyone just that much more cynical or realistic is how I like to look at it. Yeah. No. So all of these products or at least many of these products were produced up through the 19... Well I mean today still.

Erin Allmann Updyke: Yeah.

Erin Welsh: But I mean like the heyday was probably the 1940s, 1950s, somewhere around there. At the latest by the 1890s is when people had started to recognize that exposure to asbestos especially in occupational settings could lead to diseases of the lungs.

Erin Allmann Updyke: Whoa.

Erin Welsh: Yeah.

Erin Allmann Updyke: That is not a good look.

Erin Welsh: No. I mean far from it. In 1898, the Lady Inspector of Factories in Great Britain, which like I want to know more about that entire title and that entire role and everything.

Erin Allmann Updyke: Same.

Erin Welsh  
I know, right? A future episode. Anyway, the lady inspector noted that disease seemed to be higher among asbestos textile workers. And the following year, a physician named Dr. Montague Murray treated a person who had quote "an unusual fibrosis of the lungs." He didn't report on the case until seven years later during a meeting on compensation for industrial diseases when the patient that he had treated talked about how he was the only one still alive of the 10 that had worked with asbestos fibers. All the others had died by the age of 30. The committee upon hearing this story did not recommend compensation because they couldn't rule out tuberculosis which was very prevalent at that time and may have obscured the link between asbestos and health issues more broadly speaking, especially lung diseases. But still.

Erin Allmann Updyke  
Still.

Erin Welsh  
Yeah. About 20 years later, so we're talking in the 1920s or so, the word asbestosis coined by Thomas Oliver first appears in a series of medical papers examining the occupational exposure to asbestos. And this increased attention along with the case of pulmonary fibrosis in a Glasgow asbestos worker prompted a medical examiner named Edward Merewether to see quote "whether the occurrence of this disease in an asbestos worker was merely a coincidence or evidence of a definite health risk in the asbestos industry." Endquote. I'll give you one guess as to what he found.

Erin Allmann Updyke  
I can guess correctly.

Erin Welsh  
Yeah, yep. He found a quote "definite occupational risk among asbestos workers as a class." Endquote. With disability and death as possible and indeed likely outcomes from fibrosis of the lungs. This was in 1929.

Erin Allmann Updyke  
Oh dear.

Erin Welsh  
As a reminder, the Wizard of Oz was released in 1939 and asbestos production in the United States peaked in 1972.

Erin Allmann Updyke  
I laugh because otherwise you'd just cry.

Erin Welsh  
Yeah, yeah. That year 775,000 tons of asbestos were produced.

Erin Allmann Updyke  
In the US alone?

Erin Welsh  
In the US alone.

Erin Allmann Updyke  
Yeah. That is...

Erin Welsh  
It's stomach turning. It honestly is like...

Erin Allmann Updyke  
Yeah. I mean I knew that there was going to be, I knew this was going to be bad. But that-

Erin Welsh  
That alone, it gets so much worse.

Erin Allmann Updyke  
Oh dear.

Erin Welsh  
Because we're going to do like case study style.

Erin Allmann Updyke

Oh no.

Erin Welsh

Yeah.

Erin Allmann Updyke

Okay, okay.

Erin Welsh

Before we get there, let's head back to the 1930s when evidence for the harmful nature of asbestos continued to mount. So this guy Merewether, his findings did lead to some industry change because he especially noted that dust seemed to be a huge part of the problem. So he was like either minimize dust or you minimize your exposure to it and you reduce disease development. And in the places that took him up on this, which was actually like a large part of the industry in Britain, this did lead to a decrease in pulmonary asbestosis cases, delayed of course because of the length of onset. But this was specific to Britain, this didn't happen in the US because in the US similar safety measures had not been widely adopted and would remain patchy at best or more like lip service than actually protective, even after asbestos was shown to be associated at first with lung cancer. So it was suspected to be associated with lung cancer in the 1930s and 1940s and then shown definitively in the mid 1950s. And then that strong link with mesothelioma was shown in the 1960s.

Erin Allmann Updyke

Yeah, I'm not going to have any words for a lot of this.

Erin Welsh

I know.

Erin Allmann Updyke

Because it's just so United States.

Erin Welsh

And alongside the discovery of the link between mesothelioma and asbestos came the observation that it wasn't just workers exposed to large amounts of asbestos day after day for years on end who were getting sick and who were dying, but anyone who used asbestos products or lived near asbestos factories. In the 1960s or so, the great love affair with asbestos at least for the general public was over as television and newspaper reports highlighted the health risks of the substance. And faced with this backlash, the asbestos industry reacted by revisiting safety regulations, implementing new ones, sure, and funding studies that would conclude that this amount of dust is perfectly safe or well this form of asbestos is perfectly safe.

Erin Allmann Updyke

Those are the ones, those are the ones.

Erin Welsh

Those drive me up a wall. This playground full of asbestos rocks is perfectly safe.

Erin Allmann Updyke

Oh dear.

Erin Welsh

And gee, asbestos is simply the greatest and you should just trust us on this one because like we've done a lot of research and why would we lie to you? Even if we're worried about our business failing. The callous deceit exhibited by the asbestos industry goes way beyond negligence. And there are 1001 stories that show this. But I am just going to briefly go through one and that is the story of Libby, Montana.

Erin Allmann Updyke

Okay, ready for it.

Erin Welsh

Libby is a small town, population 2775 as of 2020.

Erin Allmann Updyke

Oh wow.

Erin Welsh	Very small town.
Erin Allmann Updyke	Super small.
Erin Welsh	Yeah. And it's located way up in the far northwest corner of the state of Montana.
Erin Allmann Updyke	Okay.
Erin Welsh	It's surrounded by gorgeous natural beauty, snow capped mountains, lush forests, the roaring Kootenai River. Have you seen the incredible movie, The River Wild?
Erin Allmann Updyke	Nope.
Erin Welsh	The rafting movie with Meryl Streep and Kevin Bacon from the 90s?
Erin Allmann Updyke	No but now I must.
Erin Welsh	Oh fantastic. I mean I haven't watched it in like 20 years but part of it, for all you listeners who may have seen it, part of it was filmed nearby Libby, Montana.
Erin Allmann Updyke	Okay.
Erin Welsh	Libby is also like I said the site of what has been called one of the greatest environmental disasters in US history. According to a 2016 study, 694 Libby residents have died of asbestos related diseases since 1979. And that's in a town of 2775, yeah.
Erin Allmann Updyke	Oh my goodness.
Erin Welsh	And that number which is likely an underestimate to begin with will continue to grow.
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	What happened in Libby isn't a case of whoopsie, we had no idea asbestos was so bad for you, so sorry, it's not our fault. It is a case of deliberate concealment of a company making decision after decision after decision to hide information from people to continue to knowingly expose them to deadly substances and to try to avoid any responsibility for doing so all in the name of profit. I'm getting worked up, okay. There is so, so much more to this story that I'm going to go into right now and I encourage everyone listening to follow up to get the full picture. I used a few sources for this that I'll post on our website but mostly I took from a book called 'An Air That Kills' by Andrew Schneider and David McCumber who are two journalists that played a big role in exposing the Libby scandal. And it's a great source for more details on this. But I'll do the best I can right now.
	The asbestos situation in Libby, which had been known to residents and lived by residents for decades, started to gain national recognition in the fall of 1999 when an article about it was published in a Seattle newspaper. When the EPA got wind of this article and these outrageous, these seemingly outrageous claims that it made, they were incredulous. First of all, if there were this many cases of asbestos related disease and deaths at the time, it was reported as 198 deaths in this one tiny town, the EPA would have known about it.

Secondly, the article was claiming that it wasn't just the miners that were getting sick and dying of exposure to asbestos, it was also their families, their spouses and children, as well as other members of the community who didn't have any direct connection to the mine. This had to be sensationalist journalism. But to find out just how much misreporting was going on, the EPA had to investigate the situation for themselves. Over the next couple of years, what they ended up finding was that not only were the reported numbers accurate, but if anything the article barely scratched the surface of the horrific situation that had unfolded over the previous decades in Libby.

Erin Allmann Updyke

Wow.

Erin Welsh

The story begins really in the 1920s when a man named Edgar Ally established a mine to produce a substance called vermiculite, which when heated expands greatly, making it useful in many different products as insulation for buildings, in concrete, in packaging to protect what you're shipping, in soil to keep it aerated. The possibilities seemed endless. At one point, I think it was around 1960 I read, that there were even experiments in Libby to see whether vermiculite could be added to animal feed or loaves of bread.

Erin Allmann Updyke

What? Why?

Erin Welsh

Turns out that the bread rose faster and got moldy more slowly.

Erin Allmann Updyke

Stop it.

Erin Welsh

I know. Sometimes it's like you don't need to do something just because you can.

Erin Allmann Updyke

They didn't stop to think if they should.

Erin Welsh

Yeah, exactly.

Erin Allmann Updyke

Okay, yeah.

Erin Welsh

Oh my gosh. Yeah. The vermiculite deposit in Libby was one of the largest ever discovered. And to give you some idea of just how huge, Libby produced up to 80% of the entire world's supply of vermiculite between the 1920s and 1990 when the mine closed.

Erin Allmann Updyke

Whoa.

Erin Welsh

Now on its own vermiculite is nontoxic. But in Libby, vermiculite sold under the name Zonolite, was not on its own. The vermiculite there was contaminated with a form of asbestos called tremolite or tremolite actinolite, or Libby amphibole asbestos. So like you said Erin, it was one of the more shorter spikier fibers that are highly pathogenic and highly carcinogenic. And when asbestos was found to co-occur with this vermiculite, it was called quote "one of the largest deposits of asbestos ever uncovered."

Erin Allmann Updyke

Oh dear.

Erin Welsh

If we revisit the timeline of when asbestos related disease was first recognized, it shows us that by this time, so by the time that asbestos had been recognized to be present in this vermiculite, the occupational hazards of asbestos were well known and the evidence would just continue to pile up over the years. And the asbestos industry was more than ready to deal with these findings by trying to keep anyone from knowing about them of course. Starting in the 1930s, there was an industry wide push to prevent any negative press about asbestos by funding experiments on the condition that these companies maintain complete control over the reporting of the finds, by ordering trade magazines like Asbestos Magazine, was a real thing, not to write anything about the health risks of asbestos, by making it a policy to not tell employees that they were working with a deadly substance. For instance, the president of Johns Manville, which was a major player in asbestos products, said that managers at another asbestos company were quote "a bunch of fools for notifying employees who had asbestosis." Endquote. And when one of those managers replied quote, "Do you mean to tell me you would let them work until they drop dead?" Endquote. The president of Johns Manville allegedly said quote, "Yes, we'd save a lot of money that way." Endquote. It's like cartoonish how...

Erin Allmann Updyke

Villainous?

Erin Welsh

How villainous, how evil these people were.

Erin Allmann Updyke

I really just have it was such a hard time relating. Like how?

Erin Welsh

How do you do that? How do people do that?

Erin Allmann Updyke

How are you a human?

Erin Welsh

Right. You have no moral compass whatsoever.

Erin Allmann Updyke

I mean wow.

Erin Welsh

Any mention of the word cancer was dropped from any official documentation and even providing respirators or protective clothing to employees working with the stuff was a huge no no because it suggested that hey, you should protect yourself against this stuff, this dust could be dangerous. And they didn't want to make any suggestion to that effect.

Erin Allmann Updyke

Right.

Erin Welsh

And there was no question whatsoever that the dust was dangerous, especially in Libby. A state inspection of the Libby mine in 1956 when it was still the Zonolite company showed that the asbestos content in the dust at the mine and mill ranged from 8%-12% which is huge.

Erin Allmann Updyke

Like 8%-12% of the air?

Erin Welsh

Of the dust. And it was a very incredibly dusty place. Yeah, 8%-12% was asbestos.

Erin Allmann Updyke

Whoa.

Erin Welsh

The inspector recommended of course that improvements be made to reduce the overall dust levels as well as exposure to the dust by changing stuff like the ventilating systems and providing PPE. And he concluded his report warning that the disease would likely occur in employees who had continued exposure. Pretty clear message, right? Yeah. Do this or your employees will get sick and die. But when he came back a couple of years later, nothing had been done. And when he came back a couple of years later after that, having made again those same recommendations, things still hadn't changed. If anything, the concentration of asbestos in the dust was even higher. How could the company simply ignore these reports if they're being done by a state inspector?

Erin Allmann Updyke

Because there's absolutely no enforcement policies! Welcome to America!

Erin Welsh

Yep. Not only that, there was an agreement-

Erin Allmann Updyke

Stop it.

Erin Welsh

Between the mine and the state of Montana. The inspectors were only allowed to access the site to perform these inspections on the condition that the reports be kept confidential to mine management only. Not only did Zonolite know about the dangerous levels of dust in the mine, they also had proof, proof that they themselves gathered that asbestos exposure was actually causing disease in mine employees. In the late 1950s, mine management had X-ray screenings done of the entire workforce and the resulting report by doctors showed that 82 workers out of the 130 screened had signs of lung disease. Not one of them was informed.

Erin Allmann Updyke

I'm sorry. Okay. Okay. I'm gonna go into work, I'm gonna get an X-ray. Why? I don't know. They're not going to tell me. No one's going to tell me the answer but it turns out all of you have asbestosis.

Erin Welsh

Yeah. Except they weren't told that, they were just like hey, free X-ray screenings, hey, free physicals. We're going to do this every year and collect this long term data set.

Erin Allmann Updyke

We're not going to tell you about it.

Erin Welsh

Not gonna tell you, not going to tell everyone. And hope this never gets out. Yep, none of the workers were told. And nor were they told when the company W. R. Grace purchased Zonolite in 1963 and took over mining operations. W. R. Grace was fully aware of the asbestos content in the dust and the asbestos related disease becoming more and more common in mine employees. But like Zonolite, they choose to do nothing or worse than nothing. What could be worse and nothing? I'll tell you. When Grace's corporate safety chief Peter Kostic was informed of these X-ray reports that had been done, he suggested that those with the most severe disease be reassigned to less dusty, less dirty jobs. Quote: "If we minimize their exposure to dust, chances are we may be able to keep them on the job until they retire, thus precluding the high cost of total disability."

Erin Allmann Updyke

Yep. Yep, yep, yep. Plus also let's now let's bring in a whole bunch of new people who have had less exposure and expose them to the high levels of dust.

Erin Welsh

Yeah.

Erin Allmann Updyke

Let's not do anything about the dust.



Erin Welsh

It's like let's calculate how we can maximize disease and death in these people but also use them until the end of their lives.

Erin Allmann Updyke

Like parasites.

Erin Welsh

Yeah. Yep, yep, yep, yep, yep. Eventually some PPE was offered but it was more lip service than anything since it got incredibly clogged with dust basically right away and people just wore them around their necks. And it was just like I can't breathe in it, like I have to clean it all the time and I'm getting it... Yeah. It's hard to imagine how this could get even worse or more evil but it does. And I'm sorry that I keep saying this but it just happens. Because W. R. Grace also had evidence that asbestos dust from the mine found its way into the town itself, detectable quote "in downtown Libby on many dry days". Endquote. According to an internal memo. How much dust are we talking? In 1969, quote: "24,000 lbs of dust a day were expelled from the large stack on the dry mill. The dust was about 20% asbestos and had tested as high as 40%." Endquote. And the production of asbestos would continue to increase in later years, doubling even at some points. The asbestos contamination in homes, in laundry hung out to dry, in soil, and some of the most contaminated places were the little league fields and playgrounds where vermiculite tainted with asbestos was spread intentionally. There are pictures of piles, huge piles of dust and children playing in them.

Erin Allmann Updyke

Oh dear.

Erin Welsh

It is heartbreaking and horrifying. It was on the clothes of miners who came home from work, not told that they were coated in a deadly substance as they hugged their children and spouse. Entire families in Libby developed asbestos related disease from this constant exposure and W. R. Grace continued to secretly monitor lung disease in their workers with a confidential report in 1969 concluding that quote "although 17% of our 1-5 year service group have or are suspect of lung disease, there's a marked rise, 45%, beginning with the 11th year of service, climbing to 92% in the 21-25 years service group." That report ended with this ridiculous understatement. Quote: "This suggests that chances of getting lung disease increase as years of exposure increase." Endquote. It's more like a guarantee than it is suggestive of a relationship. Like what? Okay. Where was the US government in all of this? That's too big of a story for me to even go into but not doing-

Erin Allmann Updyke

Anything.

Erin Welsh

Anything to protect employees, only to protect and bending to the will of industry. OSHA, the Occupational Safety and Health Administration, was created in 1971 in large part due to occupational exposure to asbestos and the incredible work done by asbestos researcher Irving Selikoff. So why hadn't OSHA or the EPA or NIOSH looked into the mounting cases of asbestos related disease and death in Libby? Well they actually had. In 1980, with reports on the mine showing that levels of asbestos exposure were 100 times what OSHA then deemed to be safe, now guidelines are even more stringent, and that workers were at risk of developing severe asbestos related disease. Not only that but that the quote unquote "common knowledge" that disease could only happen after prolonged exposure, that was wrong.

The report from 1980 read, quote: "Mesothelioma, a marker disease for asbestos exposure, has occurred in persons with exposures as brief as one or two days and in persons with exposures as low as those found in the homes of asbestos workers and in the neighborhoods around asbestos mines, asbestos product factories, and shipyards." Endquote. Despite this, despite these reports, nothing seemed to be done about it. When investigators from the EPA began their investigation of Libby in 1999, 2000, 20001, they came across these reports showing that they were covering the same exact ground that other people at this organization had done before. Yet for some reason those 1980 reports were not followed up. Why? What was that reason? It's unclear.

There is some speculation that politics played a role. W. R. Grace's CEO was super tight with Reagan, who was president at the time that the decision to follow up would have been made. And under Reagan, the Grace Commission was established to find ways to cut funding for the EPA. And so the Grace Commission ended up suggesting a whole bunch of decisions for the EPA. And you know I will say that it seems unclear what those recommendations were or what those decisions were, but I don't think it's super far fetched to imagine that they might have gone something like nothing to see here, Libby is fine. It's one of those things where a lot of people work at the EPA, work at OSHA, work at NIOSH because they're passionate about protecting people, protecting the environment.

Erin Allmann Updyke

Right.

Erin Welsh

But their hands are often tied by whatever administration is currently making decisions and those decisions can often be guided by industry interests rather than human interests.

Erin Allmann Updyke

Yeah.

Erin Welsh

Because there's money in industry interests but there's not in the everyday person.

Erin Allmann Updyke

Humans.

Erin Welsh

Yeah.

Erin Allmann Updyke

Yeah, it is. It's a really depressing kind of tightrope balance thing to think about when you start looking at cases like this, right. It's really depressing.

Erin Welsh

Yeah. Even though nothing was done about those reports from Libby from 1980, there were still these passionate people in the EPA and elsewhere fighting for the ban of asbestos products. And in 1989 the EPA did enact such a ban on the quote "manufacture, processing, and selling of almost all products containing asbestos." Endquote. And that was a huge triumph that got national attention. What didn't get as much attention was when the ban was overturned within just a couple of years.

Erin Allmann Updyke

1991?

Erin Welsh

1991, yep.

Erin Allmann Updyke

Yep.

Erin Welsh

And I feel like many people might be surprised to learn that asbestos is far from banned in the US and that the US still imports and uses literal tons of asbestos every year. And it's been an ongoing battle. And in fact, the Trump administration actively fought against regulating asbestos and Trump himself claimed that asbestos was quote unquote "100% safe" and that anti asbestos movements were a conspiracy by the mob. Anyway, it's just another demonstration of something we're always saying on the podcast which is that public health and politics are heavily intertwined. You can't separate them.

Erin Allmann Updyke

By the mob, Erin?

Erin Welsh

I know. I mean it's absurd. The vermiculite asbestos mine in Libby closed in 1990 but the damage was far from over. The lag time between exposure and disease was one component but another was the enormous contamination that Grace left behind. Starting in the late 1990s and early 2000s, former employees of the W. R. Grace mine in Libby and family of those employees successfully sued the company to cover their mounting healthcare costs. And the company was ordered to clean up the asbestos contamination at the site of the mine. But the company fought everything tooth and nail, including hiding funds and declaring bankruptcy so they wouldn't have to pay out or clean up.

Erin Allmann Updyke

Classic.

Erin Welsh

Yep. And if it weren't for the amazing efforts by activists such as Gayla Benefield, they may have gotten away with it. In the early 2000s, Libby was declared a superfund site to help prioritize its decontamination. And in 2009 for the first time in the agency's history, the EPA declared a public health emergency in the town to help provide healthcare assistance. It's a victory for those who have fought so long and so hard to hold W. R. Grace accountable for their actions that resulted in so many lives ruined, lives ended far too soon and too painfully. But these activists, they never should have had to fight that hard and for that long. W. R. Grace knew what they were doing and they knew the harm that it would cause. And they sacrificed the people of Libby, Montana anyway in the name of corporate profits.

Erin Welsh

Unfortunately the story of Libby, Montana is still unfolding as the diagnoses and deaths continue and it's not limited to that small corner of the state. Asbestos contaminated vermiculite from Libby was shipped around the world without a warning label because as they acknowledged, a warning label would lead to substantial sales losses, so we better not. It was shipped to at least 750 locations in North America and to countries such as Japan, Australia, New Zealand, England, Ireland, France, Germany, Venezuela, Saudi Arabia. Asbestos-containing zonalite was used in insulation for millions of homes in the US. And in the 1970s, fireproofing using asbestos and vermiculite was sprayed on tons of buildings and skyscrapers including the World Trade Center. There's an ad from 1981 for asbestos fireproofing showing the twin towers with the line quote: "When life depends on it, you use asbestos." Endquote.

Erin Allmann Updyke

I saw in one of the papers that I read they were mentioning detecting like how high the levels got of asbestos in the air in New York after the collapse of the World Trade Center.

Erin Welsh

Yeah.

Erin Allmann Updyke

Yeah.

Erin Welsh

One EPA chemist who tested the dust after the World Trade Center found that quote "the concentrations of asbestos in settled dusts inside homes in Libby is comparable to the settled dust inside the buildings in lower Manhattan." But the message was let's get Wall Street back up and running, come on back, we gotta do this. Once again profit, corporate profit is more important than human lives and health. There is no telling how many people around the world have gotten sick or have died from exposure to Libby asbestos and W. R. Grace is certainly not alone in putting profits before the health of their employees, not in terms of asbestos or tons of other toxic substances. And honestly this could be an entire podcast where we talk about corporate negligence and how so many companies don't care about their workers and continually expose them to things. And you could just do a whole series on asbestos because there are so many more stories out there. But the story of Libby and of asbestos overall is still unfolding. It's still happening as we speak. And so now I'll hand it over to you Erin, to bring us up to speed a bit on the current asbestos situation, which is I know a tall order.

Erin Allmann Updyke

Yeah, I will try my best right after this break.

TPWKY

(transition theme)

Erin Allmann Updyke

As of 2016, which is the most recent numbers that I found, 67 countries around the globe have banned all forms of asbestos. As you mentioned Erin, and because many of our listeners are US based, as are we, the United States is not one of those. The partial ban on manufacture, import, processing, distribution of some asbestos products that was enacted in 1989 was overturned in 1991 and since then from what I can tell all we have in the United States are some cobbled together state, federal, and local laws that have varying degrees of regulation on asbestos. And that's kind of it. From what I could gather, 2019 was the first time at least recently that the EPA has proposed further restrictions. In 2022 they proposed a further ban on the use of chrysotile asbestos for all ongoing uses. Again, this is the most common form of asbestos. And as of March 2023 which is when not only we're recording but also most recently that the EPA has updated this website, this ban which would be pretty comprehensive is still just a proposed ban, as far as I can tell it's still open for public comment and it has not been enacted at this point.

Erin Welsh

Okay.

Erin Allmann Updyke

In contrast, everywhere in the EU, all of the EU member states banned all types of asbestos as of 2005. And many of them had banned it earlier than that. So the World Health Organization unsurprisingly has a very big push effort, desire to reduce or eliminate asbestos related diseases. That's kind of the angle with which the World Health Organization of course is going to come at it. But we have such a long way to go.

Erin Welsh

Yeah.

Erin Allmann Updyke

According to the World Health Organization, 125 million people worldwide are exposed to asbestos at their workplace. And they estimate that fully half, one half of all occupational cancer deaths are attributable to asbestos. And on top of that several thousand deaths annually are attributable to household asbestos exposure.

Erin Welsh

That's a lot.

Erin Allmann Updyke

Yep. Most estimates that I saw from as recently as 2014 and 2016 are that we still consume between 1.3-2 million tons of asbestos around the world every year. And for comparison, at the peak in I think it was the 1970s of overall global consumption, our peak was about 5 million tons annually.

Erin Welsh: Oh my god, so it's like barely dropped.

Erin Allmann Updyke: Right? On one hand I was like well it's dropped but not that much. Like 1.3 to 5? Like gosh, I would have hoped it'd be better than that.

Erin Welsh: I mean yeah but as long as someone is making money off of producing asbestos, it's...

Erin Allmann Updyke: I know. I know. I know. In terms of additional numbers on how many people are affected by this, it's estimated that if we look just at asbestosis, so not even accounting for cancer related deaths, 2017 it was estimated that over 3000 people died from asbestosis worldwide. Mesothelioma, it's a little bit hard to get total numbers on but in the US between 1999-2018, there were almost 50,000 new cases of mesothelioma of all types of mesothelioma that were diagnosed. And again, almost all of these are as a result of asbestos exposure. And then when we look at lung cancer, because again asbestos is causing more lung cancer than it is mesothelioma specifically, lung cancer is in some countries the leading cause of cancer related deaths, in almost all countries one of the top causes of cancer deaths, as well as a top cause of overall mortality worldwide with over two million cases diagnosed every year. And we really don't understand how much of that lung cancer burden is attributable to asbestos exposure. We really don't have a handle on those numbers.

Erin Welsh: Okay.

Erin Allmann Updyke: Because lung cancer is so multifactorial.

Erin Welsh: Right.

Erin Allmann Updyke: And I think that part of what really irked me in my... You explained a lot of things that were like really infuriating, Erin, about this story of asbestos. But I think especially when it comes to mesothelioma and the way that we view it in relation to asbestos or the way that we view asbestos in relation to disease is that a lot of papers, when they're talking about the burden of asbestos and the costs of asbestos, focus on the economic burden as it relates to compensation for exposure. So an article from the New England Journal of Medicine from 2005 predicted the total economic burden of malignant mesothelioma as it relates to compensation for asbestos exposure is up to \$200 billion in the United States and \$80 billion for Europe. And like just even using that as a metric, it just tells you how incredibly corrupt the system was and remains in terms of the amount of negligence-

Erin Welsh: Yes.

Erin Allmann Updyke: For workers and humans who are just exposed to asbestos even outside of an occupational setting.

Erin Welsh: Right.

Erin Allmann Updyke: It's depressing.

Erin Welsh: Yeah, that is a really interesting framing. I know that we often have a little bit of ugh, I don't really like that when things are talked about in terms of the economic burden.

Erin Allmann Updyke: Right.

Erin Welsh: But this seems especially not representative of the problem of asbestos.

Erin Allmann Updyke: Right!

Erin Welsh: I don't know, like I'm trying to articulate how I feel about it but it's not good.

Erin Allmann Updyke: Because it's not even just the direct like healthcare related costs of a disease.

Erin Welsh: Right.

Erin Allmann Updyke: We're talking about compensation for known exposures that were in fact negligent or worse than negligent.

Erin Welsh: Right.

Erin Allmann Updyke: And then of course we always overlook the personal burdens, right? The people who are living with this or who are living having known that they've been exposed and what does that mean? Because we don't know. What does that mean if you were exposed and for how much of your life and to what degree? And we don't necessarily have screening protocols in place. So yeah, it's really tragic I think.

Erin Welsh: Yeah. Like in Libby, people who have been diagnosed with an asbestos related disease and are wondering if their children who played on these baseball fields, who played in these dust piles of asbestos, like are they going to get diagnosed?

Erin Allmann Updyke: Right.

Erin Welsh: And a lot of them have been.

Erin Allmann Updyke: Right. And how long do you wait?

Erin Welsh: How long?

Erin Allmann Updyke: What do you check for? And yeah.

Erin Welsh: Yeah.

Erin Allmann Updyke: So in terms of where do we kind of go from here, I don't have a great conclusion. Unsurprisingly there's a very big push from a lot of organizations both globally and locally in various countries to further regulate or ban in fact all forms of asbestos on a global scale. I will also say that there is a lot more that needs to be done to understand the actual mechanisms of carcinogenesis, both for mesothelioma specifically but also for all the other types of cancers that asbestos can cause. And then I also will say that I do have a paper if people are interested in where we stand with the treatment of mesothelioma specifically because that is also a pretty depressing state of affairs. I mentioned that the median survival after diagnosis with mesothelioma is 9-12 months, that hasn't changed. And so there's I think a lot to be done as well in terms of treatment for mesothelioma because again, this isn't something that is going anywhere any time soon.

Erin Welsh: Yeah.

Erin Allmann Updyke: So that is kind of where we stand with asbestos and asbestos related cancers today.

Erin Welsh: Okay.

Erin Allmann Updyke: Yep.

Erin Welsh: Yep. Sources?

Erin Allmann Updyke: Sources?

Erin Welsh: I don't know.

Erin Allmann Updyke: Yeah.

Erin Welsh: I don't know what else to say honestly. Yeah. I have many sources for this. I'll shout out again the book 'An Air That Kills' if you want to read more about Libby, Montana. And for the history of asbestos overall, I have a lot but I'll shout out one by Tweedale from 2002 titled 'Asbestos and its lethal legacy'.

Erin Allmann Updyke: I also had a lot of papers for this one. One of my favorites actually was a report by the International Agency for Research on Cancer from 2012 that is very long and includes a lot of things other than asbestos. But they had a whole section on asbestos that I found really helpful. As well as a Lancet article from 2005 that was specifically titled 'Malignant Mesothelioma' that was specific to mesothelioma. There are honestly so, so many more though for any deep dives that you want on any specific aspect of asbestos or cancer or mesothelioma or the current status. So we will post all of our sources for this episode and every one of our episodes on our website [thispodcastwillkillyou.com](http://thispodcastwillkillyou.com).

Erin Welsh: We certainly will. A big thank you to Bloodmobile for providing the music for this episode and all of our episodes.

Erin Allmann Updyke: And a big thank you to Lianna Squillace, our wonderful mixologist for these episodes. Can you say that, mixologist? Is that right?

Erin Welsh: Sure.

Erin Allmann Updyke: Or is that drinks? I don't know.

Erin Welsh: I think it could be widely applied. However you want to use it.

Erin Allmann Updyke: Our sound mixologist.

Erin Welsh: There we go. And thank you to Exactly Right.

Erin Allmann Updyke: And thank you to you, wonderful listeners. We really appreciate you listening. Hope that you enjoyed this episode.

Erin Welsh: Yeah. It feels weird sometimes to say enjoyed this episode.

Erin Allmann Updyke: Right.

Erin Welsh

But we hope that you learned something this episode.

Erin Allmann Updyke

We hope that you feel as infuriated as we do.

Erin Welsh

Yeah. And as always a huge thank you to our wonderful, generous patrons. Seriously, you are amazing. Thank you. We love you.

Erin Allmann Updyke

We love you.

Erin Welsh

Okay. Well until next time, wash your hands.

Erin Allmann Updyke

You filthy animals.