Unmasking the Correlation Between Air Pollution and Cancer

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**SPEAKERS**

Narrator, Dr. Bill Evans, Dr. Demers

**Narrator** 00:01

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**Dr. Bill Evans** 00:17

And welcome to the Cancer Assist Podcast with your host, Dr. Bill Evans. Today we're going to be talking with Dr. Paul Demers, about air pollution and the risks of cancer. So just before we start our conversation, I'd like to remind our listeners that the cancer assist podcast is brought to you by the cancer Assistance Program here in Hamilton, Ontario. The cancer Assistance Program provides a variety of free services to cancer patients including free rides, equipment, loans, nutritional and incontinence supplies amongst a number of other supports for cancer patients, and the podcast are made possible by generous donations from individuals in the Hamilton community with the hope that by learning more about cancer, and its causes, current best treatment approaches and the supports available in our community. It will make the challenge of dealing with cancer just a little bit easier. So I'm really delighted to welcome Dr. Paul demurrers. To our program this morning. Paul is a professor in Occupational and Environmental Health Division at the University of Toronto's Dalla Lana School of Public Health, and the director of the occupational Cancer Research Center. Paul's a delight to have you here. Thank you for coming all the way from Toronto through the traffic but on the go train, making it easier. But welcome to the show this morning. Thanks, Bill. My pleasure. Now we're going to be talking about air pollution. And it was partly sparked by an article that was brought to my attention in the Hamilton Spectator back in July, about air monitoring showing high levels of cancer causing pollutants in neighbor neighborhoods across Hamilton and I guess Health Canada had undertaken quite a study and put a lot of monitors around the region and particularly in the area closer to the steel mills, but also further away. And and I guess it was probably disturbing to a lot of people about how much air pollution do we have in Hamilton? And should we be concerned? And should we take any special measures? So maybe a good place to start? Everybody talks about air pollution? But how do you define air pollution? And then maybe from that, how do we measure it to know that it's a level that we should be concerned about?

**Dr. Demers** 02:31

You know, in terms of how we define it, I mean, sometimes in my field, we might say ambient air pollution, because we're always looking in various types of environments for contaminants in the air. And oftentimes when people say air pollution, what they're talking about is those levels that are carrying across distances, and that impact kind of whole communities. So there's sometimes add the word ambient. But I think you what you can think of it as is it's not from standing right next to something usually it's it's stuff that's being carried usually from a distance that impacts us. So certainly, fire smoke is a really dramatic example of that

**Dr. Bill Evans** 03:13

recent one. Yeah, it was dramatic wildfires we dealt with during the summer. And we want to come back to that too, because there were things that I learned in my reading that we should talk to our listeners about, and the risks associated with the wildfire smoke, but I don't want to take you off your tracks right now. So it's, it's something that's coming from a distance, or particularly, but in the case of this Hamilton study here, we know we have some industries. Hamilton's was a very much an industrial city, it's maybe less so but it still has its steel mills, it still makes coke at Stelco, and so on. And there are a whole lot of other industries down in that same area, which you know, you could be concerned about. And so when we're talking about air pollution in that context, the ambient air is, you know, particularly I would imagine, more polluted closer to the source, but but it disseminates, right? Yeah,

**Dr. Demers** 04:14

yeah, so you would expect it to be higher near near industrial sources. Another major source of air pollution is traffic, and so near high near roads that have a high volume of traffic that goes through the men, some of them has very close through the downtown area of of Hamilton. And so those are another important source. And then if you look, particularly internationally, kind of home heating and other things like that are a major source. So in some of our remote communities, for instance, even burning, burning wood in chimneys, ends up being a component of the air pollution of those communities, and can certainly be a component here and internationally, it's sometimes considered the most important pollutant for many low and middle income countries.

**Dr. Bill Evans** 05:07

Right. And I gather on there, we're often talking about indoor air pollution, I guess from, from cooking and from the fuel sources that may be used in low and middle income countries for cooking or heating. Yeah,

**Dr. Demers** 05:22

but it also does, it does, you know, leave the home, and then it contributes to the kind of ambient air pollution of an area as well. Right.

**Dr. Bill Evans** 05:30

But again, it seems to me that when we talk about air pollution, it's, we have this notion that the air is not clean. But then what's what are the components that are within air pollution that are are hazardous, you know, is particular material gases? How do we how do we think about that? You

**Dr. Demers** 05:50

know, we give thought to both both gases and particulate. In the case of cancer, a lot of the evidence is stronger for the particular component of air pollution. But when it comes to thinking about, you know, other other chronic diseases, like heart disease, or lung disease, certainly we also consider the gaseous component. And people sometimes say they will, particular to simply an indicator of a broader mix of different pollutants that are coming through. So, it's always a little challenging to narrow down when you're exposed to this kind of mix of pollutants in the air. And I think we all are at varying levels, to kind of say, well, it's this one component, that's that that is the real problem. Usually that one component that we measure might be an indicator for several different components.

**Dr. Bill Evans** 06:45

So this is complicated. Yeah.

**Dr. Demers** 06:47

Never black and white, I'm afraid.

**Dr. Bill Evans** 06:49

And there are so many different chemicals involved and particle sizes. And I know from just a little bit of superficial reading that, that a lot of the research focuses on particles of a certain size. And they and I guess that there's a particular reason for that, because they get into the airway, and in particular, the context of lung cancer, get into a part of the airway where they're deposited, and hence me responsible for causing lung cancer. Yes,

**Dr. Demers** 07:19

that's correct. And a lot of our focus in air pollution studies has been on what we call particulate matter less than two and a half microns in size. And for people who don't know what a micron is, it's 1,000th of a millimeter, or 1,000,000th of a meter. So it's a very, very, he's a very, very tiny particles. But because of that, they can really go very deep into the lungs. And despite the fact that they're very small, they can be carrying other types of chemicals absorbed onto them, so they can actually carry those particles deep into the lungs. So it is always been a, you know, kind of a major area of concern for us in the area of air pollution research.

**Dr. Bill Evans** 08:03

Now, what are the particles actually made up of? Is the chemicals like the bends, pirating or something? Or is it? Or is it actually something more physical to which the other chemicals are attached, I don't really understand this. It's

**Dr. Demers** 08:17

it's, it's more physical, it's either a small solid particle generally, or, or could even be liquid and just a tiny liquid droplet of liquid that would still rank as particulate, in terms of how we measure it. But it could be made of multiple things. One of the concerns is that some of these particles are not soluble in nature, and so they get deep into the lung. And that itself is a problem that that can cause reactions in the lung that would be kind of unhealthy in the long run and that have been associated with lung cancer.

**Dr. Bill Evans** 08:55

So I was kind of intrigued by the fact that being a lung oncologist for a lot of my career that as we've been controlling prevalence of tobacco smoking, that the proportion of people who were the air pollution is in fact, the second most common cause for lung cancer nowadays, which I actually should have been aware of, but it wasn't.

**Dr. Demers** 09:25

Yeah, internationally. That's true. Yeah. I mean, right now Health Canada and public health Ontario and some other agencies would probably say that they believe that radon is the second most important in Canada. But internationally, yes, air pollution is extremely important. And if you've gone to, particularly some highly polluted cities, and we're we're lucky in, in Canada, even what we consider highly polluted does not rank as highly polluted internationally. You'll see that there, the levels are much, much higher there.

**Dr. Bill Evans** 10:00

I actually read that air pollution is responsible for 8.7 million deaths globally. Now those aren't all lung cancer deaths, of course. So they said only about 265,000 were lung cancer deaths. But still, in all, I guess air pollution is responsible for other pulmonary conditions, heart disease, things like that. Right? Yeah, for

**Dr. Demers** 10:21

a wide variety of health effects and our estimates for Well, I guess the most recent one that I've seen for Canada for air pollution is a study that I was involved with, which involved researchers across the country, called the comparison study that was sponsored by the Canadian Cancer Society that really found that approximately 7% of lung cancers in Canada can be attributed to, to air pollution.

**Dr. Bill Evans** 10:48

So, you know, you mentioned a number of sources, industrial automobiles, and so on, I guess very practically. What can we do about that? How does an individual protect themselves apart from the public policy issues? But how does an individual deal with it? If you'd if I guess if you go to China, you see a lot of people wearing masks, or we all be wearing masks? In Hamilton and through downtown or, or practically, what can we do? Or is there anything that we should be doing other than public policy?

**Dr. Demers** 11:19

Well, you know, I think public policy is the major thing when you come to things like air pollution, now, very susceptible people can wear masks, and that makes a difference. Staying inside can make a difference if when we have things like, you know, fire smoke coming in, and having particularly short term, you know, high levels. When we, you know, in the long run, our air pollution levels have been going down gradually in Canada for many years, which is a good thing. And we hope they continue to go down in the future, particularly as we maybe move away from purely, you know, gas or diesel powered vehicles, that will make a big difference. And then, I think, as the article that you mentioned, you know, that the steel industry is moving away from coal and other things like that, that are particularly bad for air pollution. And

**Dr. Bill Evans** 12:14

I'm really interested to hear about the investments the federal government's making in the steel industry here in Hamilton and using electricity, and hence producing so called green steel, which would be quite a change from the way it's been produced in the past. And that will make a huge difference, I think, to the air quality and in the Hamilton area. This past summer, there was incredible amount of smoke from fires all across our country and and what is it about the smoke from a fire that makes it a particular concern?

**Dr. Demers** 12:56

Well, you know, incomplete, we call it incomplete combustion, where you're not burning things just 100% cleanly away, produces things like polycyclic aromatic hydrocarbons, which were measured as being, you know, relatively high here in Hamilton, that can arise from burning coal also, in things like that, and we're burning, burning wood, or any kind of incomplete combustion, including cigarette smoke. So that's a particular concern. And it's simply it does add, add to our concerns. But it is impressive how it can contribute to the to our air pollution burden even very far away from from the fires, they were not close at all. Here is a I actually have a place up in the mountains of BC and when there's a fire close by, there's a different concern. Yeah, you get a red glow in the sky at night, it's and then you expect the smoke to be there. But to come from Quebec to to hear or the fire smoke that impacted New York City, which was not anywhere near the Canadian forest fires is just kind of an amazing impact on our overall levels of air pollution.

**Dr. Bill Evans** 14:22

And it's the smoke that comes from those forest fires are any more harmful than air pollution from other industrial sources?

**Dr. Demers** 14:34

I'm not sure if it is that that much different it's more to me the added burden of it. I mean, certainly if you're, you know, you're burning wood in your chimney, you're basically producing some of the same thing. But the some of these fires can be smoldering for long periods of time and that produces a lot of particulate And I think that's what we're really getting his a lot of this particular traveling.

**Dr. Bill Evans** 15:07

And again, if we have a repeat next summer of what we saw this past summer precautions for individuals with specially if he could sort of smell the smoke in the air and maybe you have a respiratory condition already you already suffer from asthma or chronic bronchitis or chronic obstructive airways disease, should you be trying? Should you wear an n95? Mask? Would it make any difference to your health?

**Dr. Demers** 15:38

I mean, I would certainly consult with a health professional, but I think, you know, those kinds of masks can stop, if they're particularly if they're a good quality, mass like an n95 that fits well on a face, it can reduce people's exposure to particles, but also staying indoors during particularly high episodes can, there's always a trade off, which is a reason I would, you know, have it as a discussion with somebody who knows your health conditions more because, you know, also exercising and being out is good for you. So there's always I think a trade off between trying to hide, you know, from this and being out in it. But also masks if you already have a respiratory condition and you are struggling against a mask. That can also be a challenge for some for some folks. So it's something to think about carefully and discuss with somebody who's knowledgeable about your own health conditions. When

**Dr. Bill Evans** 16:36

I used to practice in downtown Toronto, had a office at face University Avenue always perplexed to see people jogging down University Avenue at the time, the the traffic was heavy, and pollution from the cars was greatest. And I wonder, are you being more helpful or harmful to your health when you're jogging in the environment of all that exhaust fumes from cars? So I think people should think about where they do their jogging. And another exercise I would imagine,

**Dr. Demers** 17:08

yeah, I I've had the same feeling although I I'm a urban bicycle rider, so I'm always mixing in the traffic myself. So here I am, like, you know, judging runners running by the side of the street while I'm riding by them on my bicycle. You know, there are health trade offs if if you're going somewhere, but you know, trying to run in green spaces and doing things like that, and and or walking in, in our parks, which we took a lot more advantage of after the pandemic began. I think it's always a good idea.

**Dr. Bill Evans** 17:42

The same sort of well related to the traffic and exposures to the products of incomplete combustion. You know, when you're driving slowly, hunta, clogged highway, several visited this morning, you know, I was interested to read somewhere that they actually said, You should keep your windows rolled up. And I don't know whether these are some practical tips or whether there's actually science behind it that says, you know, you really wouldn't be exposed to fewer pollutants if you just sort of recycled the air in your car, as opposed to breathing in the exhaust from all those other vehicles that are creeping along the highway. But I guess there is this isn't enough knowledge. These are like tips that are just people's speculation rather than based in a lot of deep science. And yeah,

**Dr. Demers** 18:38

I don't know when the car is moving. But I mean, certainly when you're there idling and you're sitting in a whole field of idling cars, then I probably would raise my window because that's not good. But I'm not I'm not qualified to say what's happening when you're moving the cars moving. But there's

**Dr. Bill Evans** 18:55

another area of research where you have a lot of publications on your CV, a very wide variety of topic areas to that are fascinating, but most of the time we talked about air pollution, which seemed to be linking it to pulmonary problems. And and from a cancer point of view. It's it's lung cancer we're generally talking about. But we know from smoking tobacco that there's a whole host of other cancers that are associated with tobacco use at least a dozen other cancers now many of them in the arrow digestive tract, which kind of makes sense, right? So Is there research to show that air pollution also increases your risk of, you know, cancers in nasal sinuses and nose and throat and larynx and so on?

**Dr. Demers** 19:47

Well, I've seen there's there's studies on a wide variety of cancer sites, but I think the most consistent site so far has been the bladder, which is also an important one. For cigarette smoke, so it's maybe no surprise in that way. And that's and people may wonder, well, how does the air pollution get there, this is this thing of the small particles carrying some of these toxins very deep into the lungs, and then they can get absorbed and carry through the body. And then they're eliminated through the through the bladder and and eliminated in that way. So, bladder cancer is the one that has the I think, the second strongest evidence, at least, thus far, but certainly there are lots of studies that just hasn't come up as consistently with these other studies yet.

**Dr. Bill Evans** 20:41

And perhaps, because maybe, as you said earlier, a lot of the research tends to get done in the Delta developed countries, and we're doing a better job of controlling air pollution. But maybe it was done in some of those low and middle income countries where in cities where there is a high level of pollution, might be easier to identify the association to other malignant malignancies other than just lung and bladder retains, yeah, I

**Dr. Demers** 21:09

would think that that would be the case. The studies that look at air pollution are relatively difficult to do well, you have to kind of estimate pollution levels that might go to an individual, usually based upon where they live, but over decades, so we're really trying to kind of now that's, you can do some of that with satellite imaging these days. So it would be possible to do some of this. And in a number of different countries, we always, we have our a lot of air pollution monitoring systems here in Canada, and Canada is one of the strong countries for producing studies on air pollution, or in studies in the United States or in Western Europe. But one would think you'd be able to do it for some of the other other cancers as well. The other thing that we have in Canada, that gives us an advantage is that we have cancer registries that really cover the entire country. So we're able to, you know, look at newly diagnosed cases of cancer and not rely upon death certificates, which are not as accurate or complete. And that would also also allows us to look at a wider range of cancers, including bladder, which is less fatal than, let's say lung cancer. A lot of the studies have focused in on lung cancer just because it was just seen as the kind of first point of contact a logical place to look. And being the most, the single most common cancer in Canada, and in most countries, still, it's an easy one or an easier one to have a powerful study.

**Dr. Bill Evans** 22:55

Now, one of the things that's come up from time to time and in my career is the risk to certain occupations, and in particular, firefighters. Maybe it's driven home by the recent summer of fires in our forests, but, you know, for firefighters working in a community like Hamilton, you know, what are the risks to them of developing malignancies as a result of their occupation?

**Dr. Demers** 23:25

Well, firefighters, we just, I was part of an evaluation of firefighters a little over a year ago, I actually chaired the the working group, as they call it, of the International Agency for Research on Cancer. And you're the strongest mean, there was a number of different cancer sites that came up. And, you know, with firefighters, they're exposed in close proximity to a kind of a wide variety of carcinogens. Most of the research though, has been done on urban or City firefighters, that at least these days have a lot of respiratory protection. But we're also looking at the fact that things like soot and other chemicals in fires that when they take off their what's called their turnout gear that they're they can absorb through the skin and things like malignant melanoma, you know, we're seeing an increased risk of it's a complex situation there because when you burn a building that has asbestos in it, they have an increased risk of mesothelioma. One of the surprising things of that evaluation was that we didn't see an increased risk of lung cancer. And part of that may be that there's some evidence that firefighters smoke less and because they smoke less and some of these air pollutants kind of interact with the risk of cigarette smoking. That probably makes their baseline risk of lung cancer lower. So when you do a study, you don't see that increase risk. But you do see a kind of a wide variety of other other cancer sites that they're at increased risk of.

**Dr. Bill Evans** 25:06

And then there are other occupations. You touched on a point about the synergistic interaction between smoking and occupational exposure. I guess, one that comes to mind quickly as the situation with minors, hard rock miners, radio miners and the synergistic interaction between smoking and exposure to another hazard in the workplace for those particular individuals.

**Dr. Demers** 25:31

Yes, certainly you get synergistic effects. Well as bestest is the most well documented, but with radon as well for these for the underground miners that are exposed to very high levels of radon compared to what you would get, let's say in a home, unless you're, you know, kind of very unlucky because you get a wide range of different exposures in the home. But certainly, we see that for a lot of occupational exposures. And, I mean, so we do see a lot of increased risk of lung cancer, certainly in miners, different types of construction workers where they have kind of a similar but a range of exposures. For both of those groups, diesel engine exhaust is a concern, particularly among underground miners. And certainly, diesel exhaust is a component of our traffic related air pollution, and probably a particularly bad component. But we certainly see the evidence for that the very strong evidence that the good thing sometimes about workplace based studies is that you can look at groups with a very specific exposure, high level of exposure, and allows us to identify the specific, you know, causes of cancer that in air pollution research where people are exposed to a mix, it's harder to pull out one component or another. So occupational studies are very useful for that.

**Dr. Bill Evans** 27:06

I noticed in your CV, you've done some interesting studies that I never would have thought there'd be a lung cancer risks he had one that involved bakers and pastry cooks and confectionery makers. Synergy was a real synergy study where they had increased risk of lung cancer in that particular profession.

**Dr. Demers** 27:29

I think there was some evidence that was a while ago, I should remember this. That was a study, the synergy study was or is an ongoing study, sponsored by the International Agency for Research on Cancer, where we've pulled together data from research studies done across Europe, primarily, but also Canadian Studies and a few other studies from other parts of the world. So that we get large enough numbers to look at very specific groups. And particularly when you think about bakers, and things like that, I mean, basically, they can be exposed to those same kinds of combustion products that you might get from other sources.

**Dr. Bill Evans** 28:13

And you would never have thought that.

**Dr. Demers** 28:16

So that was a reason for to be concerned about them. But having these very big studies gives us the ability to look at these very specific groups and look across them.

**Dr. Bill Evans** 28:27

And the next one on your CV was about hairdressers, and what what that study shows or a risk hairsprays or those sorts of things that could be inhaling withholding? Well,

**Dr. Demers** 28:41

I mean, there's, there is a concern about hairdressers from a number of different chemical exposures. That mean, we're also concerned about nail salon workers, to be honest with you, you know, if you ever go to a nail salon, or even some hair salon, some of the things that you smell that might smell a bit, you know, well, you know, people who are going in there for a service are there for a short period of time. You know, maybe once every, you know, depending upon how often one gets their nails done, or things like that, but certainly not, you know, hopefully not frequently, whereas other folks there who are work there, they might be there, you know, eight or more hours a day, you and exposed to these chemicals. And so there's always a there's been a concern amongst those folks for cancer for some time, not necessarily for lung cancer, but for other types of cancer.

**Dr. Bill Evans** 29:45

So all of these are things that are in our environment and understand there's constantly new chemicals being created, which must make it extremely hard from a research point of view. I read recently that every year There's 2 million new chemicals created in the world, which seems astounding, I find it almost unbelievable. But let's assume it's even a fraction of that. And the number of chemicals entering your environment that could be in the air could be in our water supplies the ever chemicals. So your, your research center, the occupational Cancer Research Center, sort of has his work cut out for it. Examining all these things, maybe just tell us a little bit about some of the areas you're you're working on. Maybe you're doing some work in the air pollution area, maybe you're in some other areas that the listeners would be interested to hear about. Yeah,

**Dr. Demers** 30:37

I mean, we do we do a wide variety there. Certainly. I mean, your point about the number of chemicals is, certainly there are 1000s of chemicals that are used in fairly large volumes, and probably only hundreds of those have been studied. I'm an epidemiologist, I look at cancer patterns and groups of people. And there's simply not, there's so many chemicals that we have not been able to look at. So we look at classes of chemicals, and we try to make evaluations with for what may or may not cause cancer on the basis of not just studies of cancer in humans, but studies of cancer in animals and experimental studies. This is more broadly on the international stage. And we try to so we try to contribute our part in terms of human studies. Certainly we've AR might, you know colleagues have at the center of done mean, we're looking at health issues that are kind of a wide variety of different different groups. And we've tried to set up a system where we track a couple of million people and look at the risks of cancer. So, you know, truck drivers, bus drivers, taxi drivers have an increased risk of lung cancer, probably not surprising and thought to be due to traffic related air pollution, because they're professional drivers, they're on the road. So we look at these patterns, and then try to understand what the causes of them are. But there's so many different, so many different groups to look at. And sometimes you get very unexpected results.

**Dr. Bill Evans** 32:29

So we're going to take a short break from our conversation about not just air pollution, but actually really environmental pollution, we could call it and we'll be right back with Dr. Paul de Mears.

**Narrator** 32:40

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**Dr. Bill Evans** 33:24

We're back with Dr. Paul de Mears talking about air pollution and other environmental factors. And earlier you touched on radon as a risk factor. We didn't drill down on it a bit, but it is one that concerns people and it is in Canada, as you mentioned, probably the second most important cause for lung cancer. So what should people know about that both in their homes and in their places of work?

**Dr. Demers** 33:56

Well, you know, one of the I think the major points here is in terms of protection, you know with with air pollution, we really have to talk about societal change in order to do that. But in the area of radon at least when you're talking about homes and most workplaces. It is something where you can take action at a very local level, you simply have to test for levels of radon to understand what the levels of radon are. It's not particularly an expensive thing to do. And you could do lots of organizations will have radon detectors but you can pick them up I believe at Home Depot or places like that as well. And if you find high levels, it's nothing to panic about. It's just something that can be fixed. It might be it might it will cost something but it may not cost a huge amount depending upon what the nature of the problem is. You can ask somebody you know hire somebody to come in and evaluate your your Home or your workplace and give you advice and how best to control that.

**Dr. Bill Evans** 35:04

My limited understanding here is that it's likely more likely to occur in your basement, and particularly if you're built on Hard Rock somewhere, and because maybe cottage country or something. But you could improve that by just enhancing the ventilation in your basement,

**Dr. Demers** 35:22

I think yeah, and I should have started this off by saying that radon is a naturally occurring gas that's released from radioactive elements in the soil, and you can't smell it, you can't see it, you don't know it's there. And you don't necessarily know what's in the soil underneath your home. There are ways to build homes that are a bit more expensive, that would have our basements much more sealed. But if there's any cracks, or if it's an older, older place, or there's other types of problems, the radon can actually seep through that and actually enter the enter into your home. It's heavier than air, so it tends to gather in the basement. But let's say you have a forced air heat, that's actually forcing the air from your basement up into your sometimes can be forcing air from your basement up into the home. But usually we think of the lower levels or the basements as having the higher levels of exposure. Now we hear some types of public service announcements and things like this around the home. But, you know, we spend at least most adults spend about a third of their waking life at work. When you consider Yes, you know, the simple math of spending, you know, seven or eight hours a day. At work five days a week, some of us work more hours than that. So what happens at your workplace contributes to your radon exposure as well. Traditionally, the way we know about the health effects of radon, his from uranium miners and studies of uranium miners where they have very, very high levels of radon. But there are different types of workplaces that can have lower levels that can still add to your risk of lung cancer over time. So it's important to test not only in homes, but in in workplaces to understand whether there is or is not a problem.

**Dr. Bill Evans** 37:31

And then there's the synergistic interaction with tobacco for use, right? Yeah, we always have to make a plug for smoking cessation on these programs, because it's one of the healthiest things you can do is to to break with the addiction to nicotine and to stop smoking, because that's a personal layer pollution and also affects others around you. So it's so important not to smoke for a healthy lifestyle, and to reduce your risk. But here's an example where it's synergistic with something else you might be exposed to in your environment. Another question that comes up is, are younger people more vulnerable to air pollution? Or maybe even radon? Should we be more concerned about protecting our are infants and youth than even our adults? In relation to the whole exposure to pollutants?

**Dr. Demers** 38:31

Yeah, now, first off, I'm going to qualify this by the fact that I study adults and not children. I'm not an expert. In children's certainly we consider children, particularly very young children, infants to be a vulnerable population for for this as your body is developing. And so I wouldn't be particularly concerned about them as I would be about other high risk populations when it comes to things like air pollution. But the other thing to think about is that you are risk of cancer. It's never actually it's never one thing. It's almost always a combination of things. It's what we call a multifactorial disease, you know, and that's why we worry about not only our environmental pollutants in our workplace pollutants, but also things like cigarette smoking. But other types of factors that put you at increased risk. I mean, there's a correlation unfortunately, with between air pollution and lower socio economic status, lower income people tend to live in more highly polluted areas. Other types of populations that might have an increased risk like racialized populations are all So correlated with living in highly polluted areas. So there are lots of different groups that we need to worry about here. But in the case of children, I, because it's not my specific area of research, I'll tell you that what I think about is that cancer risk goes up generally with age, all cancers go up with age. And the general underlying theory of that is that it's caused by multiple causes. And you're basically building up your risk over time, by your experiences in life and different risk factors for causing cancer. What you want to start your clock ticking as late as possible with that, you know, we don't want to start, if we can avoid exposing young people to risks of cancer at an earlier age, it means that maybe they won't develop cancer till an older age and anything we can do, to put it off means we're increasing our quality of life, our our years of life. So at a general, you know, just a general principle, I would want to protect children and young people from being exposed. And that includes, you know, exposure to things that are under your control, but also working in hazardous workplaces. It's a reason you know, we don't our child labor laws, you know, are supposed to protect children from working in hazardous situations. And that should certainly apply to, to things in the air and not just safety hazards.

**Dr. Bill Evans** 41:38

Makes perfect sense, really, truly. So much of what we talked about in relation to air pollution and other occupational exposures really comes down to having good public policy. And it also ties in very much with climate change, as well. And things that will help us with climate change, or probably thinks it will also help us with air pollution. So things like transitioning to green steel, or electric cars, and so on should all be helpful, overall, but it does make you wonder, what can the individual citizen do to be helpful in relation to this is just supporting their politicians as they move forward legislation that moves us in the direction of trying to correct climate change, or advocating for cleaner air and initiatives like the federal funding for one of the steel makers in Hamilton? Or what do individuals? What can individuals do to be helpful in this whole issue?

**Dr. Demers** 42:54

Well, in my mind, certainly supporting public policy is is the greatest way to do that. I mean, we could, I could say it's, it's, it's good to drive a less polluting vehicle motor vehicle if you have to. But the fact is that it's public policy that's pushing us to have more of these low polluting vehicles available. So can it goes hand in hand, our options for what we can do individually are increased by by having the right public policies in place so that you can choose to have that. So you can choose to, let's say, use transit, rather than a car or to walk or bicycle to work or things like that. All of those things are, they're a combination of our ability to make our own personal decisions with public policy that facilitates that that really makes that possible. No,

**Dr. Bill Evans** 43:51

see, you walk the talk, you came from Toronto to Hamilton today on the go train, rather than in a polluting car, on the gardener and the QE w. So those are the kinds of things that we could all be doing more of to reduce our, our carbon footprint and are polluting the environment that we live in. As as we close out today's podcasts, we really just like to remind listeners that you can listen to our prior podcast by visiting the cancer systems Programs website at cancerassist.ca. Now, probably over 40 podcasts available to cover a wide range of different types of cancer and treatment, as well as supportive care services that are available in the Hamilton area. Paul, I really want to thank you for your conversation today. It's been very informative about not only air pollution, but other pollutants in our environment and the complex interactions with biological systems that can lead to ill health and some very practical advice for what we can do both to try and keep ourselves individually protected, but also to be more active in in helping to shape public policy going forward, so I really appreciate all your thoughts today and thanks for joining us.

**Dr. Demers** 45:06

Thanks, Bill. I've enjoyed the conversation.

**Narrator** 45:08

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