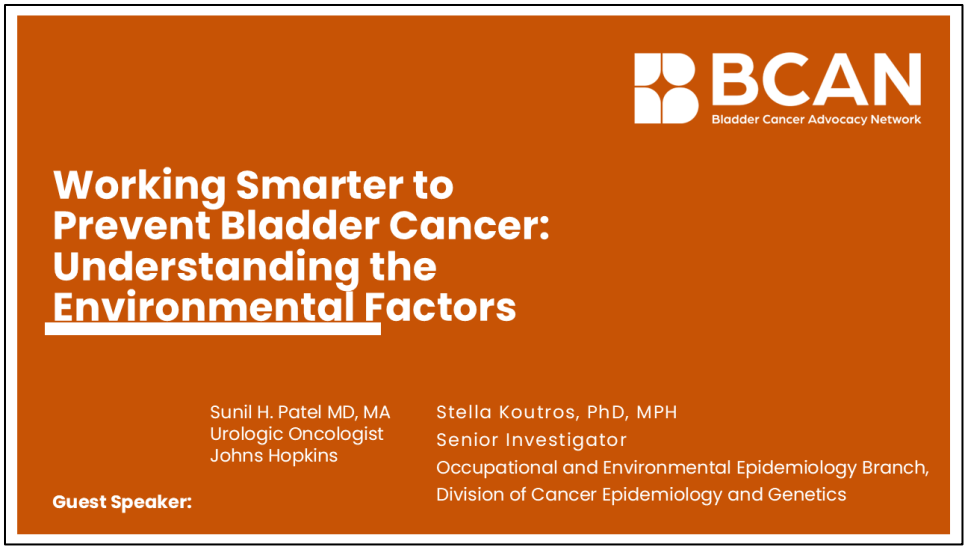


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**Patricia Rios:**

So with that, I want to transition to some of the questions that we have received from our listeners. Dr. Koutros, there's many questions focused around the smoking. And sorry, I was just reading the chat. I got a little distracted. So I think this goes back to the dosage and timing conversation that Dr. Patel was discussing, but the effects of smoking history, I guess many of our listeners want to know where does the risk increase?

Does it have to be continuous? What if it was only a pack for 10 years? So I guess the dosage and the timing is sort of, if you have more insight to share around that.

**Dr. Stella Koutros:**

Yeah. So we know pretty confidently that if you ever smoked, you have higher rate of bladder cancer. And yes, the number of years and the packs per day you smoked all definitely influence that. So people who are current smokers at the time of diagnosis, regardless of how many years, they tend to have longer duration of smoking, but they have the highest risk of smoking. They have about a four to five time higher risk compared to never-smokers. People who are former smokers have a lower risk, about two to three times higher than never-smokers. And it does increase with duration, but regardless of whether you smoked for 10 years and then maybe stopped for 30 or 50 years, that 10 years of smoking is still enough to increase your risk of bladder cancer compared to not smoking. So we do know that. And yeah, those things are important.

And part of the reason that with the exposures we talked about today, we want to get a sense for that history because we know that bladder cancer and a lot of cancers have a long latency. We know they develop many, many years down the road. So even those 10 years of

smoking that you did or the few years you might've worked in aromatic amines manufacturing facility, those will still be important many decades later.

**Patricia Rios:**

Okay. Thank you for answering that. How about secondhand smoking?

**Dr. Stella Koutros:**

Yeah. So secondhand smoking has been a little bit of a mixed bag. I mean, the results in the human studies and the epidemiologic studies have been mixed. There are some studies that have shown positive associations, some studies have shown it's really not that much. So I would say compared to tobacco smoking and even some other smoking, I think somebody said something about cigars, but cigar smoking has also been linked to bladder cancer risk. I would say it's a little bit more mixed about secondhand smoking, what we really know for sure.

**Patricia Rios:**

Okay. Thank you. And so what would be an advice that you would give to those who are exposed to secondhand smoke, say people who work in casinos?

**Dr. Stella Koutros:**

Right. I mean, I think it's difficult, right, because one thing I should have said, a lot of... I think I put in my slide that some exposures are modifiable, but when they're in our workplace, it's not exactly voluntary. We have to work and people have to make a living. And so it's difficult to sort of balance that. And we kind of have to understand the risk for bladder cancer through that lens of these voluntary and involuntary exposures. But obviously we would recommend that exposure to cigarette smoke, we would like to limit as much as possible.

**Patricia Rios:**

Thank you. So you talked about different, so occupations, hairdressers, firefighters. And so military, for some of these, should there be some sort of surveillance program, particularly those that have been exposed and what that may look like in terms of screening urinary tests, for example?

**Dr. Stella Koutros:**

Yeah. So we don't have right now a really sort of validated screening test for bladder cancer. So that makes it difficult to make any recommendation for screening programs per se. Certain other cancers have recommended screening tools that have proved to be useful and we haven't gotten there with bladder cancer yet.

There's a huge amount of clinical and research work focused on this question in particular, sort of trying to see whether we'll be able to get to a place where we can look at a person's urine and blood and see if we can detect cancer early. I think there'll be a lot of development in this area over the next 10 years, but because we don't have that yet, it's difficult to recommend who should or shouldn't be screened.

But I think we may eventually want to consider if we do end up having a test that might work that way, what high risk groups could be targeted.

We'll see. All of that is kind of a TBD at this point.

**Patricia Rios:**

Got it. I think that's something that we're all looking forward to over the next 10 years, for a screening tool to become available. And so there's a question about whether research has been done looking at the substances that healthcare workers are exposed to, particularly chemotherapy?

**Dr. Stella Koutros:**

I actually don't know the answer to that question with respect to healthcare workers. Maybe Dr. Patel would've been better for this question with respect to actually people who have received maybe chemotherapy for other cancers. I'm not sure if that's what the question is referring to. I could get back to you on that, but I'm not sure.

**Patricia Rios:**

I think it was more like healthcare workers, I think for example, x-rays, radiology, the exposure that comes with that.

**Dr. Stella Koutros:**

Oh, okay. Well, if it has to do with radiologic sort of risks, those have not been determined among healthcare workers for bladder cancer. What has been identified is that people who have been exposed to radiation, either pelvic radiation for some other cancer diagnoses, there's evidence there that people who've had the type of exposure have increased risk of bladder cancer in the future.

Also, information from sort of radiologic events like Chernobyl, we see elevated rates of bladder cancer after those kind of big events. So there is a body of evidence in some specific settings that radiation is a risk factor for bladder cancer.

**Patricia Rios:**

Okay. And I just got a note from the person that asked the question, what about administering or mixing chemotherapy? Is there any data on that?

**Dr. Stella Koutros:**

No, I'm not sure. I don't think there's any data on that at this point, but I actually think it's a really interesting question. And I believe that... I actually think some of our colleagues in Canada are thinking about something similar to that. But as of right now, I would say we don't have enough information on that.

**Patricia Rios:**

Okay. Thank you. I think Dr. Patel talked about other factors that elevate the risk for the exposure. So there's a question here from one of our listeners who wants to know, as a hairstylist who has a dad who just had bladder cancer, is my risk higher due to the genetic factor?

**Dr. Stella Koutros:**

Yeah. Well, just considering the fact that your father had bladder cancer, that is a risk factor. So people who have a first degree relative who have bladder cancer do tend to have a higher risk of bladder cancer themselves. So we do have enough information that there is a risk related to genetics in that regard. And what those genetic factors are exactly is still something we're trying to understand more and more about. And we've done a lot of genetic studies. I had it at my top there, the link to one of our sort of larger comprehensive studies on genetics, and we're understanding more about the genetic contribution, but having a family history is definitely a risk factor.

**Patricia Rios:**

Thanks for addressing that. And so we're almost at time, so I have two more questions. The one question is, there's a lot that I hear around microplastics and the risk. Is there any evidence, data on microplastics at the moment and any connection to bladder cancer?

**Dr. Stella Koutros:**

Sure. Right now there is no evidence about microplastic exposure and bladder cancer risk. One of the biggest reasons is what I said about exposure assessment. This is going to be a really challenging thing to study for cancer because it's a relatively newer exposure and we understand it could take decades for something to sort of manifest, but also we haven't set up studies up until this point to deal with the contamination issue from plastic.

If you think about it, the blood draws and the tubes we use, all of that is plastic. And so even for some of our studies where we have some banked biological sample collections, it will be really difficult to use that or leverage any of that data in the context of this contamination issue. And so people are just beginning to deal with some of those considerations and try to develop some studies to understand what the health effects might be, but it's a very new area and right now we do not have any information about bladder cancer risks specifically.

**Patricia Rios:**

Okay. And what you mentioned was a great transition to my last question before we close, which I'm going to couple with another question. So the first piece of that question is, what can patients do to help advance the knowledge in the field of these exposures, risk factors? And then also, what can patients and their families do to reduce their risk?

**Dr. Stella Koutros:**

Yeah, I mean, I think part of the reason that Dr. Patel and I are always really happy to be here with BCAN in the community is because I think communicating these risks and educating people is one of the number one ways you can pass along that information to your family.

I had a researcher who was here and I was talking about gasoline. He was like, "Oh my God, I like to work on repairing, putting old cars together. And I use gasoline all the time all over my hands just because to do this stuff." And I said, "Well, you might want to consider wearing gloves when you do that." Or in the context of environment for people who might be on a private well, communicating with you or other relatives to make sure you test your wells, to make sure that the levels of arsenic are not above what we want them to be because they're not regulated the same way public water supplies are regulated in the United States.

So hearing what the key risk factors that we already know about and trying to pass that information along to your family, even if you're a bladder cancer patient already, passing that knowledge on to others is, I think an important thing that we're doing here and that I always appreciate BCAN's invitation to share that information.

**Patricia Rios:**

Yes. Knowledge is power. Thank you, Dr. Koutros for being here with us today and for sharing this information and shedding light on all these different occupational, environmental risk factors that we're exposed to on a day-to-day.

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