

The Great Simplification

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[00:00:00] **Sian Sutherland:** The reason that I am still 10 years in as an entrepreneur, so obsessed by the plastic crisis, is that I do think that it's an extraordinary gateway into the poly crisis. Think about the impact on overconsumption, on biodiversity loss, the human health crisis. But what I think is very interesting and exciting is if we get this right, it could also be the gateway out.

[00:00:25] **Dr. Shanna Swan:** That's a really good point. The possibility is there for everyone to do their part, to cut down exposure, and that will really make a difference and improve a lot of things, including fertility.

[00:00:42] **Nate Hagens:** Today I'm pleased to be rejoined by Shanna Swan and Sian Sutherland for an update on the state of hormonal and endocrine health and to discuss their work leading systems level change to reduce humanity's toxic chemical exposure for many different products, but especially from plastics. We also take a deep dive into Shanna's brand new Netflix documentary, the Plastic Detox, where she helps six couples, all of whom are facing unexplained fertility challenges, embark on a three month effort to dramatically lower their daily exposure to plastic related chemicals in hopes of better health markers and ultimately pregnancy.

[00:01:23] Dr. Shanna Swan is one of the world's leading environmental and reproductive epidemiologists, and a professor of environmental medicine and public health at the Icahn School of Medicine at Mount Sinai in New York City. Additionally, Shanna co-authored the 2021 book. Countdown, how our modern world is threatening sperm counts, altering male and female reproductive development, and imperiling the future of the human race.

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[00:01:47] Sian Sutherland is the co-founder of a plastic planet, which is one of the most recognized and respected organizations tackling the plastics crisis using a pro business, pro solutions and proactive approach to shut off the plastic tap. In this conversation, Shanna and Sian share the latest information.

[00:02:07] On the health effects of endocrine disrupting chemicals, including fertility levels, sperm counts, and other biological markers. Additionally, Sian shares how this recent research is informing her plastic Free Babies campaign, which is meant to inspire businesses and governments to make systemic changes to remove plastics from the lives of babies during their first 1000 days of life.

[00:02:32] As both Shanna and Sian point out, the issue of toxic chemical exposure is now reshaping human ecological and societal health across generations, and what we do with this knowledge today may ultimately define human's ability to navigate the future. I hope you enjoy this important conversation as much as I did.

[00:02:52] With that, please welcome my friend Shana Swan. And Sian Sutherland. Shana Swan. Sian Sutherland, welcome back to the program.

[00:03:02] **Dr. Shanna Swan:** Thank you so much, Nate.

[00:03:04] **Sian Sutherland:** Thank you so much, Nate. It's a pleasure to be here.

[00:03:07] **Nate Hagens:** This is what Seniority does, right? instead of just meeting you two as activists and scientists on this important issue, now we're friends.

[00:03:15] So this conversation is one on an issue we all care about. And, you know, that's what four years plus, of this podcast does. Dr. Shanna Swan, you were one of the very first guests on this podcast over four years ago, where back then

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you joined me to discuss your findings on global, sperm count decline around the world, which are caused, at least in part by endocrine disrupting chemicals.

[00:03:44] Now, four years later, I've invited you back alongside with our mutual friend and also former guest plastic free supply chain advocate, Sian Sutherland, to discuss your new documentary out, on Netflix in which you apply these findings to real world lives of couples who are facing unexplained infertility.

[00:04:05] Lots to discuss, but maybe since it's been over four years, could you maybe start with giving us a brief overview of the current scientific state of average hormonal health across the globe and what the main contributors toward these, recent trends are?

[00:04:23] **Dr. Shanna Swan:** Well, Nate, that's a very big question, isn't it,

[00:04:27] **Nate Hagens:** consider it a speed round. Just give us the bullet points maybe.

[00:04:30] **Dr. Shanna Swan:** Yeah, right though. So the bullet point is that, things are not looking great. We've recently and others have, looked at testosterone and it is following the same trajectory as sperm count decreasing and more rapidly since 2000.

[00:04:48] And, the decline in, in sperm count concentration is continuing to decline. we don't know so much about hormones in women, which is another project that we should get into. so when we talk about hormones, really the picture is a male and female and most of our data is on the male. and the causes of course, this is very, controversial and I.

[00:05:21] read over and over again of people who say, well, this is due to, you know, people's lifestyle. and maybe their choice, you know, of what they, or the

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hormonally, you know, impactful things that they do. But I like to refer to non-human species when that argument is raised because the same changes in fertility, and reproductive success that we see in humans, we also see in non-human.

[00:05:51] And the non-human species do not make the same choices. They don't have the opportunity to make those choices. So, that speaks to, a cause, which is not true. Choice. Choice. And that is going to be involuntary exposure to many things, including chemicals that affect hormones. And that's what I'm most interested in.

[00:06:13] **Nate Hagens:** I saw a story yesterday. I, doubt that you, either of you have seen it, but I have this new thing called wide boundary news. So I'm scanning the news and there was an insect in the Arctic Circle that had microplastics in its gut. and, you know, this is a global human and non-human, issue, and it's quite, concerning.

[00:06:36] And by the way, Sian, I'm gonna get to your plastic-free babies in the latter half of this conversation. but you've also watched the movie and you are, colleagues with Shanna. So just chime in here and we'll be co-hosts for the first part as we, we unpack this movie. For the average person listening, where are the most people exposed to these endocrine disrupting chemicals in, in their, lifestyles and behaviors?

[00:07:01] **Dr. Shanna Swan:** I would say primarily in their home, and secondarily in their work, and thirdly, in their. Daily lives and other places like their car and walking outside through what, you know, air, contaminants and air. So it's, there's no getting away from it. There's no safe place. There's no safe place.

[00:07:22] **Nate Hagens:** The, movie is just fantastic.

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[00:07:25] So beautiful and, just aesthetically impressive. So I imagine you're going to, be on multiple podcasts, but since you're on this podcast, I have to ask you some wide boundary questions. And many people who follow this channel might nominally hear about declining fertility rates and think that's a good thing, because they believe over time we're gonna need fewer people putting strain on our natural resources and planetary sinks.

[00:07:56] So why should those people who do also care about the long-term wellbeing of the human species on earth care about hormonal health and IL decline?

[00:08:04] **Dr. Shanna Swan:** So let, lemme just. Address first the question of, too many people, too few people. I think, what we have to realize is as fertility declines, the, pyramid, the population pyramid, which I think we all know what that looks like, it's typically very small on top and very big on the bottom.

[00:08:27] Yes. And as we shrink the bottom through declining fertility and we increase life expectancy, you can imagine that what's gonna happen is that pyramid is shifting. So it's an inversion of the population pyramid. Does that make sense?

[00:08:44] **Nate Hagens:** It does.

[00:08:45] **Dr. Shanna Swan:** And this is something that has many, negative implications.

[00:08:48] One of them, economic, I mean, the, there's not enough people at the bottom to support the people on the top. and that's what is happening in, for example, in Japan. so they, it's not just the number of people, it's also where they are in this pyramid that's important. so. I don't wanna say whether what's a good

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thing and a bad thing, but I would say that people not able to have children when they want it is a bad thing.

[00:09:21] I would say that categorically, that I think, I believe that this is a basic human right, that you should be able to have a child if you want it. Not everyone wants it. That's fine. So I think this is an increasingly, serious threat, I think to, to. What we require in our lives, many of us, not everybody, but if we do, we should be able to do this.

[00:09:46] We should be able to have a child if we want it.

[00:09:49] **Nate Hagens:** That's an entirely different conversation. The, demographics and the fact that many countries of the world have, below replacement rate, fertility, and a lot of this could be due to toxic chemicals, but that's a topic for another day. Your new documentary, that you were a central part of called the Plastic Detox will have just come out on Netflix as of the release of this episode where you applied the findings about the health effects of endocrine disruptors to couples facing infertility.

[00:10:26] quite an amazing story. so let's start with a setup of the intervention. What were the inclusion criteria for specific couples to do the tests with and, over What timescale were you working with them?

[00:10:39] **Dr. Shanna Swan:** So we were looking for couples with what we call idiopathic infertility. Unexplained infertility, no obvious causes for their infertility or medical causes.

[00:10:51] So that was the primary criteria. and, they had to be not in IVF, they had to be a couple that together and not traveling separately. So they have the opportunity to conceive. they had to be willing to be filmed, which was a problem

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for some people. And, they, this couples are all over the United States, and I had the pleasure to travel to their home several times and to get to know them.

[00:11:22] And they are fantastic. They're just a fantastic group of people. And I can also say that apart, from the, you know. Responses of their hormone systems and, their ability to get pregnant and their sperm count and so on. That, which was really important and documented in the movie, many of them actually changed their whole attitude toward these chemicals and the, to the extent that some of them actually changed their career course at, to the, so that they could, you know, put energy into decreasing plastic exposure.

[00:11:55] So,

[00:11:57] **Nate Hagens:** so I understand, Shanna, that the setup included testing chemical markers of the couples through testing their urine. what specific markers were you looking for and what were the average levels, of these in the couples at the beginning, before the intervention?

[00:12:17] **Dr. Shanna Swan:** So we were looking at. The urinary metabolites and may, maybe I'll just say that when you're exposed to these chemicals, you can measure them in your urine.

[00:12:29] That's how you know how much you have. Everyone can do that. So the ones that we looked for were metabolites of the bisphenols, the phthalates, and the parabens. I can't tell you what the levels were at the beginning, but I can tell you they went down and some of them quite dramatically. Some actually down to non-detect.

[00:12:50] And in the film you can see those exact level levels.

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[00:12:54] **Nate Hagens:** So from there you helped the couples swap out products, in their lives that they had been using for less toxic versions. Were there any high impact products or areas that you specifically had the couples target in order to reduce their chemical exposure?

[00:13:13] **Dr. Shanna Swan:** Well, the product substitutions were not. Uniform, uniform. And they were based on interviews that the staff of the group, company that I work with, Million Marker used. So what Million Marker does is if you sign up for this for getting your urine tested, you can also sign up for this feedback program, educational program.

[00:13:40] And in that program, somebody calls you up, somebody knowledgeable and says, tell me, what did you put on your face this morning? What was that brand? Can you show that to me in case they didn't know? Let me see. Let's read the ingredients. And what did you wash your clothes with and what did you clean your counters with?

[00:13:56] And what do you store your food in and on They do an inventory, a personal inventory of that person's exposure, right? And that's how they decide what products to change. So if you're not using, a cleaner that contains, you know. Chemicals we're concerned about, like the phthalates, then you probably won't change that one.

[00:14:22] But if you, for example, store all your food in plastic, you'll receive as part of your swap. Some, other containers, plastic free containers. And we also use plastic free toothbrushes and shower curtains and on. So we tried to. Based on what people said their exposure was and based on their urinary levels, we wanted to give them something safer and that's what they got.

[00:14:52] **Sian Sutherland:** Shannon, I wanted to ask you, a bit more about the products that Million Marker were highlighting with a couple surprised at some of

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the products that they said that's something that is contributing to, to your endocrine disrupting chemical exposure. 'cause things for me, like personal care. You know, I used to run a skincare brand, so I know the aate, the thickeners, the chemicals that we use to give it that lovely slip and feel.

[00:15:18] But were they surprised at just some of the products they'd never dreamt would be containing some kind of plasticizers?

[00:15:24] **Dr. Shanna Swan:** Yes. And, different for different people of course, but almost all the women particularly were surprised about fragrance, that, you know, this wonderful product that they buy and love is not actually good for them.

[00:15:42] and they were, that was one of the things they were reluctant to give up.

[00:15:45] **Nate Hagens:** Is it because of the container, the fragrance comes in? Or the fragrance itself?

[00:15:49] **Dr. Shanna Swan:** The fragrance. So one of the functions of phalates is to hold scent and color, and that's why it's put in perfume and why it's put in your makeup and your nail polish.

[00:16:01] anything where there's color and scent. And then it helps absorption, which is another, that's not the scent, but that's the cosmetics. So we always think of plastic as plasticizers as something that makes plastic soft or hard. Yes, it does that, but it has these other functions. And retention of scent in color is one of them.

[00:16:22] And absorption is another important one. Yeah.

[00:16:25] **Nate Hagens:** Has anyone ever made, a pyramid of all the things we do from petrochemicals turned into plastics and ranked them from pretty central and

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important to modern civilization and pretty esoteric and on a luxury sense, like perfumes are not really necessary for our life.

[00:16:45] Has that ever been done?

[00:16:46] **Dr. Shanna Swan:** That's a good idea. I don't know of any pyramid like that. But it certainly would be possible.

[00:16:54] **Nate Hagens:** All right. Let's add that to the list, Shanna.

[00:16:57] yeah. so, I'm, I am hoping that everyone watching this podcast will go to Netflix and watch this movie, but you can share it here now.

[00:17:10] What happened to the couples environmental toxin levels in the following months after these swaps, and, how, long was the period that this intervention took?

[00:17:21] **Dr. Shanna Swan:** So, I'll start with the last question. So the intervention is three months. I chose that because it takes 70 days to make a sperm.

[00:17:29] And don't forget, both the men and the women were going through this. And so we wanted the sperm that was gonna conceive the pregnancy, hopefully, to be as healthy as possible, and for the man not to have been exposed in that 70 day period. So 90 days was the length of the intervention. and. I'll just tell you the protocol briefly.

[00:17:53] Okay. So we enrolled them, we talked to them, if they were willing, they, then if they agreed to be in it, they agreed to collect their samples. So then we sent them kits. And those are through partners, semen collection through something called Fellow, which is a, you collect it home and send it in, and then it gets tested.

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[00:18:15] and the urine collection was through a million marker. Same idea. and so they did that at the beginning and they also did it at the middle, right. Six weeks and they did it at the end 12 weeks. And they did it in the am and they did it in the pm. And the man did it. And the woman did it. So we had a lot of things to correlate.

[00:18:36] How did this change over the day? How did the agree between the couples, men and women and the couples and so on. So that was really important. What we didn't collect, because it failed, and I have to confess this, we did not successfully collect any blood at all. and that's because the development of the home, blood testing.

[00:19:00] Kits that were sent out. It is relatively new. We could do it now, but during the film, we didn't succeed in collecting blood. That was a limitation because we couldn't get hormones, which we really wanted to get. so just say that. So what we did collect were the urine and the semen and measured semen quality, all kinds of parameters of semen quality.

[00:19:24] And in the urine we measured the phthalate metabolites, paraben metabolites, and bisphenol metabolites. Okay. Three classes of metabolites. We could have done more with more money, actually, but you know, we could have had pesticide metabolized, we could have had PFAS and so on. But we, this is what we had and that was.

[00:19:48] Really interesting. And those did go down over the course of the three months. So we saw how it was at the beginning, middle, and end, and saw that trajectory of improving health, well, improving contamination level if you would,

[00:20:03] **Nate Hagens:** reduced toxins and increased sperm count.

[00:20:07] **Dr. Shanna Swan:** That's correct. That's correct.

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[00:20:09] **Nate Hagens:** Nerdy question for me here. Yeah, I did not know, until I saw the movie that sperm is created from scratch and every 70 days. So, but women's eggs are at least somewhat influenced in utero when they're first born. Right? So the endocrine impact on a man has a 70 day turnaround where it's a lifetime on a woman in that sense.

[00:20:41] **Dr. Shanna Swan:** Both the men and the woman have germ cells that produce these egg and sperm, and those germ cells are influenced by how they were exposed when they were in utero. Okay? So that's important to remember. It's not just one generation effect here. And yes, so you can get your eggs messed up, if you will, by your mother's exposure when you're in the womb.

[00:21:06] That's scary to think of. but then. As in the runup to the time of conception, you have other ways to interfere with the sperm production or the egg production.

[00:21:20] **Nate Hagens:** So what were the sperm levels for most of these men before the intervention? And is that if you could average them, is that reflective of most of the global population in your scientific experience?

[00:21:33] **Dr. Shanna Swan:** I, can't give you any numbers because I just don't have the data in front of me here. But I recall that one of the men was ex had extremely good seeming quality. I think the best measure of fertility potential is probably, the number of modal. Motility the per percent of modal sperm. And that was very high in one of the men.

[00:21:58] The other men were not doing so well. and they all improved except the one that was already very good. He stayed very good, but the others became. Entered the Fertile Range.

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[00:22:11] **Nate Hagens:** So one of the questions I had when watching the movie is you say there's, and I think, I will recommend our guests. I, mean our, viewers watch your original podcast and some of the other ones we've had on plastics.

[00:22:26] but I seem to recall that 40 million is, what is that? 40 million per

[00:22:32] **Dr. Shanna Swan:** milliliter.

[00:22:32] **Nate Hagens:** Per milliliter. Boy, that's a lot. seems to be like you, you alluded as is some sort of minimum viable threshold. It, the non-scientist or non endocrine scientist in me finds that hard to believe that even a million sperm per milliliter would be hell enough to get pregnant.

[00:22:53] But why is that 40 million? Why is that relevant?

[00:22:57] **Dr. Shanna Swan:** I can't tell you biologically exactly why num one number works and one number doesn't, but, well, first of all, if you have no sperm, no baby, right?

[00:23:05] **Nate Hagens:** Yeah.

[00:23:06] **Dr. Shanna Swan:** No sperm, no baby. Oh, that's easy. And I can tell you, that safely, you know, 75 and over, you're good to go and it doesn't really matter.

[00:23:15] So when people say the actual count doesn't matter, that depends where you are. Yeah. So if you're above 70 or 75, fine. You have sort of equal

[00:23:25] **Nate Hagens:** chance 5 million

[00:23:26] **Dr. Shanna Swan:** m per milliliter.

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[00:23:27] **Nate Hagens:** Yeah.

[00:23:27] **Dr. Shanna Swan:** Yeah. But, if you're, you know, in the low range and it goes down quickly and there's a many, there's a paper with a wonderful graph of this where they looked at the, how long it took, how many months they coupled tried before conceiving.

[00:23:47] Months to conception, time to conception. below 40, it drops off really quickly, down to zero. So if you're around 45 or 40 and there's something you might argue about in the exact level, then it's gonna drop off. Oh, so when that, so then it matters a lot. So low levels are really bad and very quickly it doesn't really matter.

[00:24:11] **Nate Hagens:** So just from, and, Sian, I promise I'm gonna get you fully involved here 'cause I know you have a lot to say. But this is, foundational to, to this conversation. I just, in three months, these couples, well the men of these couples, their sperm count turned around and went up just from these simple removal of household products.

[00:24:36] Just

[00:24:36] **Dr. Shanna Swan:** that's all we did. and we did talk to them about other lifestyle changes. For example, one of the men was a construction worker. So, using protective gear was not in the intervention per se, but of course when I talked to him and he told me what he did, I asked him about protective gear and then he started using it.

[00:25:00] Now that undoubtedly, I can't say for sure, but likely helped and it was not in the intervention. So they, there might be other changes. They got the idea, ah, we have to watch out for our exposure and maybe they changed other things, right?

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[00:25:15] **Nate Hagens:** Yeah. you're being too, modest, I think or too scientific, which is why I love you.

[00:25:23] But Occam's Razor would say these five couples had declining sperm count, borderline not able to conceive, and all of a sudden their sperm count goes up because of some interventions, from an aerial view. This is hella important finding.

[00:25:38] **Dr. Shanna Swan:** Oh, I think it's important. All I'm saying is that people could do other things if they think about what they're actually, once they have their mind, you know, alerted to the fact that they can get exposure from everywhere.

[00:25:52] You know, we didn't intervene on clothing, for example.

[00:25:56] **Nate Hagens:** Yeah,

[00:25:56] **Dr. Shanna Swan:** clothing is important. It had, there are many chemicals, particularly the PFAS chemicals, which were not measured in this study, but by changing your clothing to safer, cleaner clothing, that could be helping all this, all these problems there, there are other things, they could eat organic.

[00:26:14] We didn't do that. So there's many other things that people can do other than what we did in the intervention.

[00:26:20] **Nate Hagens:** So this is kind of the min, almost the minimum.

[00:26:23] **Dr. Shanna Swan:** yeah.

[00:26:23] **Nate Hagens:** So, so for the purposes of, the detox documentary, you were only able, as you said, to look at sperm levels. so you could only look at the.

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[00:26:33] Male role in infertility, but how much do we understand about the role and impact of female infertility as it pertains to these discussions about endocrine disrupting chemicals?

[00:26:45] **Dr. Shanna Swan:** So unfortunately we know a lot less, and one of the key barriers is it's very easy to get a sperm count, right? You can do it at home in a kit and send it in, you get a number.

[00:26:57] But for a woman to get her egg count is really complicated. She has to go to the doctor, she has to be scanned. It's, really difficult. And in, in general, you know, the men's organs, sexual organs, reproductive organs are out there. You can see them. They're, you know, but for women it's not the case. The ovaries are not accessible.

[00:27:17] They're not easy to view. So it, the, our information about the whole story in women is much more limited. And, that's just the biology of it, I think. but had we been able to get. The woman's hormones, we would've had an insight into that aspect of reproduction for women, which is also really important.

[00:27:40] **Nate Hagens:** So before we discuss the biggest result, the number of pregnancies, were there any other notable changes in the couples over the course of this three month intervention that you observed?

[00:27:51] **Dr. Shanna Swan:** Yeah, I'm glad you asked that because we were quite surprised by, the changes in people's lives. and maybe part of this is that they were happy, you know, felt good about being in this intervention and, were more careful in a lot of ways that we didn't track.

[00:28:13] But many of, and this is not, you know, the not questionnaire data, it's anecdotal. Nevertheless, many of them volunteered that they were sleeping better, were less stressed. were, Feeling better. And we also did do surveys on

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sexual function, sexual satisfaction. There's a questionnaire called the Shim, which is used for erectile dysfunction.

[00:28:40] And on all of those measures, the men and the women did better. higher levels of sexual satisfaction and so on. So that's pretty interesting. and I think the stress and the increased length of sleep and so on felt better. You know, how much of that. Being in this movie and, being, you know, having people call you up and tell, ask you how do you feel that

[00:29:07] **Nate Hagens:** yeah,

[00:29:07] **Dr. Shanna Swan:** that could play a role.

[00:29:08] **Nate Hagens:** Right. I'm gonna work out more today 'cause I know I'm gonna be on camera sort of thing. Right, right, right. But you never know.

[00:29:13] **Dr. Shanna Swan:** Exactly. Exactly.

[00:29:13] **Nate Hagens:** So, so now for the, most exciting results, how many successful pregnancies were there over this three month intervention and after and was this what you expected as a scientist doing this?

[00:29:24] You know

[00:29:24] **Dr. Shanna Swan:** what, I'm not gonna say.

[00:29:25] **Nate Hagens:** Okay.

[00:29:26] **Dr. Shanna Swan:** Okay. Because I, I want everybody to watch the movie and I think it's the big, it's the big, you know, the

[00:29:34] **Nate Hagens:** big

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[00:29:34] **Dr. Shanna Swan:** results.

[00:29:35] **Nate Hagens:** Yeah. Please watch the movie. Well, there was some

[00:29:36] **Sian Sutherland:** No spoil from Shanna.

[00:29:39] **Nate Hagens:** Wow. Yeah,

[00:29:40] **Sian Sutherland:** no spoilers from Shanna. I had a quick question, Shanna, because just as you were saying that they generally felt better, and obviously we know that fertility is just one of the conditions, the human ailments that are impacted by endocrine disrupting chemicals and there are many others.

[00:29:56] **Dr. Shanna Swan:** Right. That's a

[00:29:56] **Sian Sutherland:** good point. So, so, and, but, and this is your absolute core expertise as fertility, but in your expert opinion, do you think that we could have a similar approach of this kind of interventional work where people feel empowered that they have more control than perhaps they ever thought on their own health for things like Absolutely.

[00:30:14] Absolutely. You know, heart disease. Great.

[00:30:18] **Dr. Shanna Swan:** Thank you, Sian. So this

[00:30:19] **Sian Sutherland:** is just the beginning. This is really just

[00:30:21] **Dr. Shanna Swan:** the beginning. Absolutely. that's a really good point. So for example, we know that these chemicals are what we call obesogens. They increase obesity. So we didn't, we did actually track weight.

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[00:30:34] Change and there was some weight loss. So that was not a, I'm not talking about that was not the primary goal of this at all. But that would be an interesting intervention, wouldn't it? You know, you, we, could, specifically intervene on Obesogens and see how their weight changes that we could all think of these interventions.

[00:30:53] They're easy to think of. Another thing that's affected, is our antibody response. So, the PFAS chemicals, which we didn't track, but could, you know, lower antibody response, which means that we're more susceptible to disease and so on. So, you know, there's so many ways that these chemicals impact our body.

[00:31:13] And so intervening on one class whose effects we know from scientific studies should be really effective and that this is just a model of a whole range of interventions that we and others can do to show how chemicals in the environment impact. All aspects of our health.

[00:31:31] **Nate Hagens:** You have been a lifelong scientist in this field, Shanna.

[00:31:36] And how was this for you to do a science tethered documentary with real humans as a trial as opposed to in a lab doing an academic paper, just doing all that? what was your experience?

[00:31:50] **Dr. Shanna Swan:** Well, first of all, I loved it. I still love it and I'm gonna go on doing it. And I, think the, for me, from my own personal experience, it's extremely satisfying to sit with a couple and talk.

[00:32:05] I, I'll just tell you, share this example. It's such a beautiful example. I, sat with one of the men and I showed him his sperm results and I showed them how they had changed over time. And after that conversation, he sent me an email

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and he said, when you drove away, there were tears in my eyes because now I knew I was normal.

[00:32:29] I never got anything like that from an academic publication

[00:32:35] **Nate Hagens:** boy, you know, that is really a microcosm of our entire carbon pulse situation here with AI and plastics and transportation and hundred to one exo somatic footprint of consumption. We are a species out of context. And just to have that small personal, you know, notice there's something going on in our world that isn't your fault.

[00:33:01] It's not because you're strange, it's because we're part of this global, exo somatic metabolic thing that we're finally starting to understand, and finally starting to maybe do something about. So I'm glad you shared that.

[00:33:20] **Sian Sutherland:** And also how wonderful that we're finally feeling that in this world where we feel the victim often and that we are absolutely powerless to everything that is happening to us, particularly in the world of toxicity, which is why there is such increased apathy about plastic 'cause it's so unavoidable in your life.

[00:33:37] How amazing to have the first documentary that makes you realize, oh, we have a lot more power than we thought. And Shannon, I was really interested to know, because I know this is not conventional science and this interventional work that you're doing now, you know, could be considered controversial in the world of, scientists.

[00:33:56] What reaction have you had from other scientists, do you think? Some people may follow suit, but particularly the fertility scientists.

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[00:34:05] **Dr. Shanna Swan:** Nobody's seen this. You're the first, so I don't have reactions yet, but I will tell you that we're also doing more traditional things about this intervention. For example, we have written a scientific paper, which has been submitted to a peer-reviewed journal on the results, and we're applying for a larger grant, which will involve 300 individuals, as opposed to the very small number we included here.

[00:34:32] We're trying to, you know, saddle both do both and, it's, I think both are important, but I think in terms of impact, actually getting people to make changes in their kitchen and their wardrobe, you know, and then their cosmetics. This is gonna do a lot more because I have talked about the other aspects of, you know, doing it through a publication and doing at a conference and so on and so forth for a very long time.

[00:35:02] You know, I've been talking about this in this, the academy, if you will, for a very long time. And, Frankly, it hasn't made a lot of difference, and hopefully this will make a greater difference.

[00:35:16] **Nate Hagens:** Yeah, I mean, that's kind of the soundbite. Sensational, PR glitz world we live in. science is doesn't really sell, and yet we need to lean on science to really understand what's happening, which is why I do this podcast because it's kind of a translation medium between the scientists and, the general public.

[00:35:41] Yeah. So, so Shanna, let me ask you this, and I expect you are going to answer this completely as the scientists that you are. but if other couples at home followed a similar intervention plan that people did in your documentary, how likely is it that they would experience similar results of reduction in toxic levels and an increase in sperm count that was shown in the movie?

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[00:36:06] **Dr. Shanna Swan:** I would say more probably than not, that's a safe thing to say. This is not going to ever hurt you for sure, and it probably will help. And I, again, I'll say that people without great expense could get all of these tests on themselves. They could track this, it's not a lot of money. And accompanying the film, we have a toolkit that people can see where to sign up for this, how to do this and practice, and specific things that they should reduce, and.

[00:36:41] As you've pointed out here, Sian pointed out the impacts are many. Fertility and reproductive function is spot one. And we have about 80 hormones in our body. And so there are many, ways that we can mess things up with these chemicals. And, so maybe it's not even getting pregnant, maybe it's having better resistance to, you know, disease better, immune function, maybe it's losing weight and decreasing OBEs and so on and so forth.

[00:37:14] So there's no downside that I know of except perhaps cost so many of these products. Organic food is more expensive than traditional. Some of the high-end products are more expensive, though there is an economic cost. And so, let me just add here. Because of that cost and because of who's exposed in our society, this is not really an equal opportunity problem.

[00:37:41] There are differences in different social strata. People who are less educated, may not get this information. People who live in poorer neighborhoods will not have access to a farmer's market or a grocery that has organic food. They may not have access in their pharmacy to cleaner cosmetics. So I think we didn't get into this in this study, but I think I would love to have a takeaway be, let's look at that disparity in who's exposed and how people can reduce their exposure.

[00:38:19] **Nate Hagens:** I wish we had, I mean, there's almost should have done. Either a longer or, two versions of this podcast. 'cause I really wanna highlight your work and promote it widely because this is a shot across the bow,

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in my opinion, in the environmental movement, in the toxic, endocrine movement. But there is a, like you say, a much deeper conversation here because.

[00:38:45] Plastics, microplastics, endocrine disrupting chemicals are the micro version of the carbon pulse, the macro version being oil, gas, and coals impact. And when we burn them on the biosphere and global heating, this is the micro externality in our bodies and in the bodies of other organisms on earth. And the reason that we do all this is because fossil fuels have replaced the things that humans used to do manually at a tiny fraction of the cost.

[00:39:15] And so plastics do a lot of very important things, food storage, shelf life, reduction in infection in hospitals and things like that. And one of the thoughts I had when watching this is. Will this movie and the information involved itself be a, bottleneck sort of, evolutionary, filter Because the people that actually.

[00:39:47] Make changes in their lives, those that can afford it or watch this movie 10 or 20 years from now, might be in a smaller demographic that it can actually reproduce. I mean, I had that thought watching this show. any thoughts on that, either of you?

[00:40:02] **Dr. Shanna Swan:** I think it sounds brilliant and I don't have any, response.

[00:40:07] **Nate Hagens:** So, so, you know, I want to get into some of the larger scale responses to the problem that you have laid out beautifully in the movie and in your entire career. Obviously there are some things individuals can do and you highlighted many of them in, the documentary to reduce their endocrine disrupting chemical exposure.

[00:40:27] but a lot of these chemicals are everywhere. They're in our water, our soil, even in the air. So what sort of regulations and policies would be needed to

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reduce the amount of plastic and chemical pollution, just generally daily by the hour, making its way into the general environment?

[00:40:46] **Dr. Shanna Swan:** That's of course another very, large topic and we, I'm not the expert for this, but I will say that in the EU, they are able to do this much, much better.

[00:41:00] **Nate Hagens:** So if I recall from the movie, there are a thousand times more chemicals in the EU that are outlawed than in the United States.

[00:41:08] **Dr. Shanna Swan:** So in the eu there are many more chemicals that are banned or restricted. That's absolutely true. and they have better regulation. I would say the key issue for me is before product is put into commerce, is it tested for safety?

[00:41:31] **Nate Hagens:** But, one of the questions I have there is, if we tested every single product, it's just like. Doing all the environmental tests, we would be so slow and not accomplish things that we wouldn't accomplish anything. So at some point there's a threshold on how much we can test, right? Aren't there like 70,000 untested chemicals or something like that?

[00:41:55] **Dr. Shanna Swan:** There's a very large number. we can certainly, we don't have to test all the products. It's the chemicals within the products that we have to test. Yeah. And those that are more. Widely used or appear in more products, they should be, you know, ranked. In terms of,

[00:42:13] **Nate Hagens:** if you had to guess, I don't, I know you didn't test this, but what are the primary culprits and the primary culprits that were removed in the movie BPA?

[00:42:22] phthalates. Do you think that was the bulk of it?

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[00:42:25] **Dr. Shanna Swan:** Yes. Those are hormonally active. They affect the steroids, which are important for reproductive function. You know, the, which chemicals you block and worry about have something to do with what is the outcome that you're gonna try to help by their removal.

[00:42:43] You know, so there'll be different chemicals. If you're worrying about immune function, you're gonna test for the PFAS chemicals for example. Whereas for reproduction, you wanna watch for the, those that affect steroid hormones. So what is the action of the chemical that's important, and if that's relevant to the health outcome you're trying to protect, then that's the one you wanna.

[00:43:03] You don't worry about.

[00:43:04] **Nate Hagens:** So even with knowledge and available alternate, plant-based alternative chemical products, how feasible is it for individual humans to reduce or eliminate exposure to these chemicals in their everyday life at the level of the individual?

[00:43:23] **Dr. Shanna Swan:** I think we can do a lot. We can do a lot more, I'm continually and my husband we're continually swapping out products in our house. as we hear about other exposures or, contaminants in products we're using, we just bought a new coffee maker, for example, plastic free coffee maker. we're big coffee drinkers, but so I think an awareness that this is an ongoing problem that you are, we're continually exposed to different products, new products, or have more information about the old products.

[00:43:59] So it's not a one-time thing, it's a lifetime thing.

[00:44:03] **Nate Hagens:** I don't want to go too far off a field, but at the office here, we have one of those coffee machines that you put a little canister in and

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then it runs hot water through that. no. And from our original, from our original podcast, hot Water and Plastic is one of the things that releases it.

[00:44:20] So if there's boiling water going through a plastic container into my cup, that's no bueno. Right,

[00:44:26] **Dr. Shanna Swan:** right. And it, I mean, heat and plastic is not a good thing wherever it happens, eating. So, because the plasticizers, they're put there to convey certain properties, but they're not tightly bound. They're not chemically bound.

[00:44:42] So if you heat it up, it, they start moving around and hopping out, if you will, on this is a cartoon version. And, then they get into the food or they get into the coffee, they get into the water, they get into you. And that's not a good thing.

[00:44:57] **Sian Sutherland:** Just add a little something about policy and chemicals and, you know, clearly we have to go back to the very root of how do we even teach chemistry?

[00:45:07] We're amazingly good at making new chemicals. We register a new chemical every 1.4 minutes. We create them with our hazmat suits in the lab and then, we release them into the environment in the form of products, and that's where we need the education.

[00:45:21] **Nate Hagens:** What I learned in the movie is we were creating chemicals.

[00:45:26] Before we had fossil fuels, like plant-based chemicals. the guy in the movie talking about that was really interesting.

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[00:45:33] **Sian Sutherland:** Yes. One of the things that I've learned recently actually from the wonderful Dr. Jane Monka who you've had on your podcast is there are, obviously, there are good chemicals and bad chemicals.

[00:45:45] We're not saying all, chemicals are bad. And what you need to be aware of with your products is inertness because everything is fundamentally made of chemicals. And what you need is to make sure that those chemicals, if they are within a product, that they are not leaching out. So we were talking with her about things like, medical devices and she was saying medical grade silicon is a lot more inert than something like natural rubber.

[00:46:11] So therefore it's better to have medical grade silicon than natural rubber. That, that may have things that, Can also leach out and impact your health.

[00:46:20] **Nate Hagens:** So the, on a scale of zero to 100, the closer, substance is to being a hundred percent inert. the better for human health and the environment.

[00:46:31] **Sian Sutherland:** Yes, and that's where we come to plastic, because we think of plastic as this inert material

[00:46:36] **Nate Hagens:** because it looks inert when we're looking at it.

[00:46:38] **Sian Sutherland:** Yeah,

[00:46:39] **Nate Hagens:** but the invisible

[00:46:40] **Sian Sutherland:** part of it

[00:46:40] **Nate Hagens:** is not inert.

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[00:46:42] **Sian Sutherland:** Exactly. It's a mixture of chemicals. It's been around so long, it's so omnipresent in our lives that we think it's on the periodic table. It's not aluminum. It's not copper, it's not cobalt. You know, it's a mixture of chemicals and many of them are toxic.

[00:46:57] So it's just review. It's looking at it in that way, and I find it fascinating that you actually. Nowadays you need to, I have a friend who's recently, been diagnosed with breast cancer. First time she had ever had the message from her oncologist, take plastic outta your kitchen, plastic and food and drink have no place together.

[00:47:18] And it's just shocking to me that we know so much about this now, but you actually have to have breast cancer before your oncologist said, oh, by the way, you shouldn't be cooking in plastic, freezing in plastic, no plastic in your fridge.

[00:47:31] **Nate Hagens:** So presumably a lot more oncologist could be having that as the first thing they're saying.

[00:47:38] All of a sudden make like maybe a 10% to 20% to 90% oncologist if that's their first response. And then it goes higher up the food chain to preventative, and conversations like this, I mean, it is happening quite fast, I think.

[00:47:52] **Dr. Shanna Swan:** Physicians don't know this. Physicians don't learn this. This is not taught in medical school.

[00:47:58] Okay. That, to me is really shocking because how can they counsel their patients to avoid these chemicals if they don't know they're toxic?

[00:48:07] **Sian Sutherland:** Exactly what I was gonna say, Shanna.

[00:48:09] **Dr. Shanna Swan:** Oh,

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[00:48:10] **Sian Sutherland:** okay. Physicians, doctors, they are not trained on this. What I also find extraordinary is how little we know as the general public about our endocrine system, the importance of our endocrine system.

[00:48:23] And when you realize that it, it is the signaling system for your entire body. Just sending those signals for how you grow, how you defend yourself, your fertility, everything that Shannon's just talked about. Your mental and your physical health is determined by your endocrine system. And when you disrupt that, 'cause we use this phrase, endocrine disrupting chemicals we, we bandied about, but what is it actually doing?

[00:48:48] It is, these are hormones, these chemicals are hormone hackers that are. Changing that signaling system. So they're disrupting the very communications network of your body. And when we think about gut health, we only recently realized that gut health was important. I really believe that the endocrine system is the one that will be the next system, that the general public will.

[00:49:11] Very fast start to wake up to. And what I hope is that Shanna's documentary is gonna be a big catalyst for that, that we realize, hang on a minute, this endocrine system is something we need to know a lot more about. And ask their doctors, talk to them about what impact is this having on me, on my kids, on the fact I can't even have kids.

[00:49:31] **Nate Hagens:** I have the same hopes, for Shanna's documentary. but staying with you, Sian, I know you do a lot of work on bringing awareness and action on the issue of plastics and endocrine disrupting chemicals through your organization, a plastic planet. can you tell us a bit about your current projects and what your general strategy is since the first time you were on the program, towards making industry level change?

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[00:49:58] **Sian Sutherland:** Yes. I talk about the way that we do our work at a plastic planet, and we are now 10 years in. And I talk about it really as a cattle prod and a lightning rod. And the cattle prod is how can we galvanize industry and governments into taking action faster to protect us and to help industry to divest of plastic faster?

[00:50:20] And we all know that's about policy because voluntary is clearly not working. And then the lightning rod as an entrepreneur is very exciting for me because that's about innovation. That's about how do we, take this gateway of the plastics crisis to not just switch materials, perhaps also switch systems.

[00:50:37] Why is it okay for us to use something once and throw it into a bin? We discard 94% of what we use, simply touching it once or twice of everything that we make. So. That's a kind of crazy fact. And plastic has obviously been a massive enabler of this single use culture. So I love the idea of how can we use this gateway to change the system, but then also the materials.

[00:51:01] So the innovation is very exciting for me. What are the materials of the future, but also how can we go back to some of the materials that we know are inert? Everything that we've talked about before, which of course is glass and stainless steel.

[00:51:14] **Nate Hagens:** So, I wanna make sure that you have a moment to talk about one of your, current and, hopefully scalable initiatives, which dovetails with the movie, which is Plastic Free babies.

[00:51:29] Can you talk about that?

[00:51:31] **Sian Sutherland:** I mean, first to set the scene. Here we are, 10 years in. We launched the world's first plastic free aisle in 2018. We have lobbied governments on plastic taxes and banning the export of plastic waste to non

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O-O-E-C-D countries. We've created the world's first solutions platform on plastic free.com.

[00:51:51] we turned up, which Shannon was with us at one of them, at every one of the negotiating sessions at the UN Global Plastic Treaty. Here we are 10 years in nothing. So if our KPI is a reduction in plastic and industry actually changing materials at scale, at the level that we need them to, we have failed.

[00:52:13] So this year we recognized that we need to do something completely different. We need to do it in this mass collaborative communications way where everybody who is concerned about the plastics crisis comes together and really creates something that is a sharp and pointy campaign that perhaps hits the underbelly of big plastic and governments to wake us all up.

[00:52:38] And that is the Plastic Free Babies Campaign. Because much as we should care about the environmental pollution, about the damage to the ocean, the fact that it's the, it's in the soil, it's in air, it's in everywhere. It's in that little critter that you just mentioned, up in, in the Antarctic.

[00:52:56] Much as it's everywhere, we don't really care. And we're proving that with our 10 years of, of apathy, really about plastic change because it's just very, hard to wean ourselves off this incredible but toxic and indestructible material. But we do care about our kids and we do care about babies, and we do care about those very first super important 1000 days of life from the moment of conception up to two years old.

[00:53:24] And in those thousand days, really your health for your entire life as a human being is laid down. That's how important those thousand days are. And babies right now are born pre-diluted. We know that they're exposed to endocrine disrupting chemicals whilst they're with, you know, in the mother's

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womb, microplastics in placenta, there's plastic in a baby's brain, there's plastic in breast milk, there's plastic in blood.

[00:53:51] So they're exposed while they're growing and they're forming their little organs, and then they're born into this unbelievably plastic world. From the baby bottle to the pacifier, the tether to the toys, to the mattress, to the PVC cover on that, to the textiles. Everything in their world is plastic.

[00:54:14] And that's what this campaign is about.

[00:54:17] **Nate Hagens:** Wow.

[00:54:20] **Sian Sutherland:** and really importantly, Nate, I just wanna say is when you have a baby. It's a terrifying time. As a new parent, you just pour so much love into that new little miracle and you really want to protect it. And when you find out these scary facts about the exposure and the importance of those thousand days, the last thing we want to do is terrify parents.

[00:54:43] So this is not a campaign that is putting more responsibility and more guilt on new parents. This is about taking the that onus and putting it very firmly on the shoulders of industry and governments because we need governments to introduce policies that will protect our babies. And it's gonna start with our iconic product, which is the plastic baby bottle, which is everywhere.

[00:55:08] I mean, where I'm obviously sitting in London, the NHS alone give out billions of plastic feeding bottles every single year, but they're keen to change. So we're working with the NHS now on trying to introduce glass bottles and all of these things I think will start to really drive a new path forward.

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[00:55:27] It starts with a bottle, then it's pacifier and teething, then it's bedding. But we will be building an entire roadmap of these are the things that we need to restrict.

[00:55:37] **Nate Hagens:** So I've never had a baby, obviously. so this is a naive question, but the plastic baby bottles, are those reusable and do they wash them presumably with steaming hot water?

[00:55:49] And does then some little amount leach out because it's not fully inert? Is that the case?

[00:55:55] **Sian Sutherland:** Yep. I mean, we already know science, has proven that in a liter bottle of liquid you've got over 16 million microplastics. And these microplastics, of course, are the vectors of the chemicals. So our big concern is the chemicals.

[00:56:11] And if you've got that in a plastic bottle, you scale that down. You look at the exposure over those first thousand days for a baby, and it's really extraordinary.

[00:56:22] **Nate Hagens:** One of the things that, that I keep with my wide boundary brain thinking about is the scaling of alternatives. 'cause if we went back to glass for everything thing, ultimately this, implies a reduction in throughput for humanity because at the margin, some of us can make healthy choices here, but if we did everything this way, it would reverse, some of the metabolism that's been built. and I think that's ultimately inevitable whether we choose it or not. However, there are some low hanging fruit.

[00:56:59] I agree with you. We should prioritize baby's health. And so, like you say, giving. Two month old humans, plastic leaching tools in their lives is like a no-brainer. Low hanging fruit. Yes.

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[00:57:18] **Sian Sutherland:** Yes, exactly. And a little like the documentary that I think is going to be so successful because it's so human. It's not about pollution, it's, about fertility.

[00:57:30] It's about couples that can't even have a baby in a similar way. I think when you wake up to the fact, and we get governments largely to wake up to the fact and then industry to innovate faster. When you wake up to the fact that I don't want to give my babies these toxic feeding. products and toys and all of these things.

[00:57:49] I wanna protect them in this vital period of time. And then I'm pretty sure you'll, your toddler, you're gonna be looking at them and thinking then why is it suddenly okay for them to have a sippy cup made out of plastic that we know has bisphenols in it? Why is it okay for my 8-year-old to suddenly be wearing a huge amount of polyester clothing?

[00:58:11] And I'm, hoping that this gateway of focusing on babies, because we are so emotional about babies, will then be a wake up call for us for everything that we have in our lives.

[00:58:21] **Nate Hagens:** I hope so too. Ana, you wanna add something?

[00:58:24] **Dr. Shanna Swan:** I think that's fabulous. And, you know, I'm so happy we're working together, on this project, Sian, but I also wanted to add.

[00:58:32] It's, this campaign is focused on babies, but the, health impact of these chemicals begins from the moment of conception and the most vulnerable period in a person's life is the first three months after conception.

[00:58:47] **Nate Hagens:** Wait a minute. So, so if you're talking about the first thousand days of a baby's life, does the first 250 of those days, is that in utero?

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[00:58:57] **Sian Sutherland:** Yes. Yep. From the moment of conception.

[00:59:00] **Nate Hagens:** What you're saying, Shanna, is that what the parents do, especially the mother, during that time, is as or more important than the sippy cups or the plastic bottles or the pacifier?

[00:59:14] **Dr. Shanna Swan:** Yes. I don't wanna compare the importance because. For example, the bottles have a, you know, it's a long period that you bottle feed.

[00:59:22] Yeah, And so that's a long time. But we looked at the development, just an example of the male genitals in relation to exposure in early pregnancy, the first couple of weeks of pregnancy. And we, saw that when there were more als, the genitals were not normal. Not normal.

[00:59:39] **Nate Hagens:** So that's a known scientific thing.

[00:59:41] Yes. Yes. And why is that important?

[00:59:43] **Dr. Shanna Swan:** Oh my gosh. Because it's, there is the whole syndrome, it's actually been named the Phthalate syndrome, and it has to do with distortion. Interruption of the normal development of the male genitalia. And I wanted to add something which we haven't talked about, and just put this in here for peoples to think about that men and women who are infertile have shorter lifespan.

[01:00:09] Have shorter lifespan. Okay. So what you're doing by disrupting fertility and reproductive health in utero and in the first thousand days is affecting the health of this organism throughout their life.

[01:00:24] **Nate Hagens:** Why would that be? Can you speculate?

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[01:00:27] **Dr. Shanna Swan:** Two things. The chemicals are, that we know about are only, if you will, the tip of the iceberg.

[01:00:34] that there are many things that are affected and changes in, for, here's a good example. we know now that, a smaller penis and more testicular cancer, are related to an a genital distance. This distance from the anus to the genitals that I study. And we know that this affects, Not only reproductive success, but health over the lifespan.

[01:01:01] So we're, we can't compartmentalize and say, okay, we're just gonna affect the reproductive system and that's not gonna matter for cardiac health and not gonna matter for, you know, other aspects of health, immune health and so on. They're all related and the markers, if you will, is almost like a canary in the coal mine.

[01:01:20] We see these changes in the genitals and that signals something is wrong and it's gonna play out over the lifetime.

[01:01:27] **Nate Hagens:** I don't quite yet understand why, other than, I mean, why does a smaller penis ha have a negative health implication? Just because you've found the correlation to other life health markers with that, like it's a high correlation for whatever reason.

[01:01:43] **Dr. Shanna Swan:** That's right. Okay. It's an indication of other changes and also of exposure.

[01:01:49] **Nate Hagens:** Got

[01:01:49] **Dr. Shanna Swan:** it. It's in, there was a harmful exposure and that harmful exposure we know is not limited to reproduction. So it's like, okay, here's a

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flag. There was bitter exposure and it affects the genitals and it also affects other aspects of health.

[01:02:04] **Nate Hagens:** And presumably, well, not presumably, I'll just ask, with the smaller penis, anal, genital distance, some of the health markers and reduction in testosterone and reduction in sperm count, are you, seeing cross correlations in all those phenomenon? In, the literature and in the testing,

[01:02:22] **Dr. Shanna Swan:** unfortunately, our, the studies on intergen distance are relatively recent and the, they are measured in babies and we don't have sperm counts on those individuals.

[01:02:34] However, there are other correlations that we do see. and there's a something, you know, the, I mentioned the phthalate syndrome, and there. It's well known now that, at least in males, all of these reproduction functions are interrelated. So nothing's, nothing is alone in your body.

[01:02:57] **Nate Hagens:** I will state the obvious here.

[01:03:00] at least, you know, I live in the United States and climate change is still a contentious topic in the broader population in this country. Not globally, it's not, based on misinformation and politics and, you know, lots of things. But this seems very much to be lower sperm count, lower babies, lower, testosterone, health, obesogens.

[01:03:26] This is a transpartisan issue. This is not a left right sort of issue.

[01:03:31] **Dr. Shanna Swan:** No. equal opportunity for, harm here. Yeah.

[01:03:36] **Nate Hagens:** Are you hoping or seeing that this is gonna be taken up, on both sides of the political aisle as an important issue?

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[01:03:43] **Dr. Shanna Swan:** I certainly hope so. I, haven't seen a political tr, you know, I haven't seen trends in one or the other

[01:03:51] **Nate Hagens:** who would be opposed to this.

[01:03:53] At least. At least at the, you know, low hanging fruit, not fully inert, most dangerous biphenyls and phthalates. Other than the chemical companies who, or maybe the fossil fuel companies that need, downstream for some of the things that are not gasoline, diesel, heating, oil, and, asphalt that need a product, who would be opposed to the things that you're suggesting?

[01:04:20] **Dr. Shanna Swan:** Well, you know, you just mentioned a. Lots of big, powerful companies.

[01:04:26] **Sian Sutherland:** Yeah. Yeah. and, obviously Nate, you know, we, Shanna was there with me, you know, being at the un plastics treaty negotiations and we were there to really platform the health scientists to make sure that the delegates were all very aware of the impact on treatment health of, plastic.

[01:04:45] But you could not imagine the amount of lobbyists that were there from the fossil fuel industry. And we know their playbook and their, playbook isn't changing and it's the same as the, tobacco playbook. And we need to be very aware of that. But your, question of who is going to resist this, is a great one because we need to look at what is the cost that we're talking about here.

[01:05:09] The immediate and the future cost. The trillions of dollars of the economic and the healthcare impact of these chemicals within plastic has already been evaluated. You know, in the medical journal, the Lancet, it's trillions of dollars. So it makes financial sense for us to curb our addiction to plastic.

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[01:05:29] **Nate Hagens:** And I would be remiss if I didn't point this out. There's no way that we have the financial wherewithal to test all the 70, a hundred thousand chemicals that are in the human system. So if we don't, if we can't do that, we certainly don't have the ability to test the impact on the millions of other species out there that are involuntarily, imbibing some of these microplastics and maybe their anal, genital distance or whatever the squirrel or gazelle equivalent of that is being impacted.

[01:06:01] We have no idea, but it's probably not zero. given what's happening in the world.

[01:06:07] **Dr. Shanna Swan:** Well, of course you have the alligator penises, which was the one of the first signals of genital impacts that was of a pesticide atrazine and decline. Number of, endangered species is changing similarly to the change in human fertility, is a good signal that it's happening in all species.

[01:06:31] I, I also wanted to add, and I don't think we've explicitly said this on this podcast, plastics are made of fossil fuel byproducts. It is not a separate problem from climate change. Okay. I think that's really important that we keep this in mind. There are people that say, well, I don't really worry about toxics.

[01:06:51] I just worry about climate change. And I go, yes. And there are two sides of the same coin.

[01:06:58] **Nate Hagens:** Let me say two things on that. First of all, Jeremy Grantham, who you both know, has twice been on this program saying, as worried as he is about climate change. And he's hella worried. His entire, foundation is addressing, and, supporting initiatives on climate.

[01:07:16] He's more worried about this. He's more worried about the endocrine.

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[01:07:26] This is like a massive systems story, and I don't, maybe I'll do it frankly on this in the future. I don't want to go too far in this rabbit hole right now. One of the problems with, the electric vehicles are gonna replace internal combustion vehicles story is that a barrel of oil, everything is used and there are thousands of products that come from a barrel of oil.

[01:07:50] So as long as there's demand for plastics as one example, we can't easily stop, the production, the extraction and refining of oil. Similarly, if we say, let's reduce our plastics, we can't easily reduce the demand for oil unless we reduce the other things like diesel, heating oil, gasoline from oil.

[01:08:17] So they're all possible to have substitutes. We need to use less of all of it. The question is, with all the complex finance and geopolitics and all the other, and AI now, and all the craziness is how do people like you who are on the cutting edge of looking at the importance of this as an environmental toxin and replacements?

[01:08:41] Sian, we had dinner in New York with a bunch of your colleagues who are using banana peels to make shoes and seaweed and leftover shrimp pieces to make things. I mean, there's all kinds of really awesome research on using what would've been human waste streams to create shoes and such. So it, it's incredibly complex.

[01:09:05] So I'm hoping that, there's a synergy and, larger tent that's built around the importance of these issues.

[01:09:13] **Dr. Shanna Swan:** There, there's an image. If I could add just something, there's an image that I like, and that I've, talked about, which is the three-headed hydra. And for me, that's the problem that we have here.

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[01:09:26] The three-headed hydra, which is diversity or diversity, loss of diversity, climate, and toxics. They're all rooted in this pool of oil, if you will, and you can't solve the problem. You can't tame the hydra or kill the hydra by just cutting off one head. That's the myth,

[01:09:46] **Nate Hagens:** but cutting off any of the heads, cuts off a lot of other things that our lives are dependent on.

[01:09:51] Which is the other unspoken part. Right, right. so, so the movie ends on a quite a hopeful, optimistic note. I'll, just be blunt. I was in quite a bad mood this morning and then I watched that movie and it was like, I was like, cheered up at the end of it. and there is reason to think that this is one of the most urgent and more easy to address of the many crises we face.

[01:10:16] How hopeful do you both feel about our ability to effectively respond to the threats from plastic pollution, endocrine disrupting chemicals? And, maybe what do you think might hold us back the most? Shanna start with you.

[01:10:33] **Dr. Shanna Swan:** You know, there's a lot of people in the world and everybody has the.

[01:10:40] Opportunity and the ability to reduce exposure and the fact that it's not just in the hands of a few people to respond, I, think is pretty encouraging. There's a, that's a, the possibility is there for everyone to do their part, to cut down exposure and that will really make a difference and improve a lot of things, including, I believe, fertility based on what we've seen.

[01:11:06] So, that gives me hope. What makes me worried is that economic forces that are opposed to reducing exposure and those are very powerful. And so you have this playoff, if you will, and I think it's, uncertain how that's gonna end up.

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[01:11:29] **Sian Sutherland:** The reason that I am still 10 years in as an entrepreneur, so obsessed by plastic, the plastic crisis, is that I do think that it's an extraordinary gateway into the poly crisis, the meta crisis.

[01:11:43] So when you're thinking about your, frankly, Nate, I'd love you to think about the impact of on overconsumption on biodiversity loss that we've just covered. Obviously the human health crisis that we've just covered, but also human rights, the, you know, the decades and lies and deceit about the recycling crime mirror, all of these things, even if you don't go to pollution and climate, then it's an extraordinary gateway in, but what I think is so.

[01:12:11] Interesting and exciting about the plastic crisis is if we get this right, because there's no one else to blame about plastic. It could also be the gateway out. And for me, things like this documentary and the Plastic Free Babies campaign, really focusing, doubling down on the human health impact, which is the only thing we care about.

[01:12:30] We should care about the turtle with a straw of its nose. We should care about, the, devastation that we've caused the environment, but we really don't. And the last 10 years have proven that to me. But what we care about is human health. And if this could be the catalytic moment that gets us into that gateway to the poly crisis where we make all these changes and we stop hyper consumption and we finally invent new materials, 'cause we're actually a pretty smart species, then wouldn't that be extraordinary?

[01:13:00] That plastic could be the gateway out. And I think the documentary is going to be a, a, Fantastic springboard for that. It's certainly gonna be a fantastic springboard for us because if it's so hard for us to have babies and Han has, you know, really documented that I never do a talk now where I don't at one point say to the audience, can anyone who knows somebody who's using IVF to conceive put their hand up?

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[01:13:25] I guarantee you 75% of people will put their hand up. So that documentary that's covering something so personal is also an amazing springboard for us to then say, and when we do manage to conceive, and when we do manage to grow a baby full term, they're born pre-diluted and their entire world is plastic and we need to do something about that.

[01:13:46] **Nate Hagens:** I fully agree with everything you just said with one small, correction or caveat. We do care about the environment. the system doesn't care. And I think that's a really important thing and I'm gonna be talking more about that and why that is this year. So, Shanna Swan. This documentary was extremely well done, and I hope it's gonna become widely seen.

[01:14:11] I understand it took almost five years to film. And before we close, I'd like to give you some space to discuss any reflections or thoughts about what it was like to work on such a massive project over a long time. What, were your biggest takeaways from filming and, what do you really hope that people will do, in our nation, in our society, after watching this film?

[01:14:37] **Dr. Shanna Swan:** For me, this process has been exciting and sometimes challenging in terms of my time and effort, you know, which has been very long run and intensive. Often I had the. Pleasure of working with two extraordinary directors, one an Oscar winner and one an Emmy winner. And, at a wonderful film team, I have to say, we became very close.

[01:15:06] it's a wonderful thing to, to travel with a film team and share, everything really along the road because we did travel a lot together. And, I always felt very, supported, by everyone on the team. I can't think of a negative, about the, the, making the film. Another big positive was meeting these incredible couples who were so beautiful and, committed and, working with them and helping them and feeling, you know, their gratitude, especially when they got pregnant.

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[01:15:44] it was, I would say a highlight of my life.

[01:15:48] **Nate Hagens:** Yeah, I could imagine.

[01:15:50] **Dr. Shanna Swan:** Yeah.

[01:15:53] **Nate Hagens:** As friends, and as colleagues and as, a more minority of humans that are fighting this fight. At this time, I just want to publicly thank both of you for your lifetime of devotion and, true north moral compass on the things that you value and are trying to change in the world.

[01:16:16] do you have any closing thoughts today to share with the viewers?
Shanna, start with you.

[01:16:23] **Dr. Shanna Swan:** I am grateful to you really for this, for your podcast, for your work, for having me on four years ago, and again now, and I think what you're doing is an important part of this picture and we don't wanna leave that out of it.

[01:16:37] That is, you're gonna reach a lot of people with your podcast and that's gonna help. It's helping. So thank you. Thank you.

[01:16:46] **Nate Hagens:** Fewer than your movie will reach, but, I appreciate your words, Sian Sutherland. Any, closing words?

[01:16:52] **Sian Sutherland:** Oh, I just wanna thank both of you, you know, Shanna, for her decades of extraordinary work, and I can't wait for the next chapter of working with you going forward.

[01:17:02] And Nate, you know, with, without your podcast, I think the entire plastic crisis would not have had nearly as much focus as it needs to. So I recommend your podcast to everybody. I can't, You know, it's the only one for me. and I just

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wanted to leave with a message of, I think if this documentary and hopefully the Plastic Free Babies Campaign does one thing.

[01:17:26] I think, I hope it makes us, the general public, new parents to be parents a little bit more outraged. Why is change not happening faster? Why are governments not protecting us? Why are they still enthralled to the fossil fuel industry? To big plastic? And we should rise up because Shanna's documentary has proven to us we have so much more power than we think.

[01:17:48] **Nate Hagens:** Gaia speed. Do you both? Thank you and to be continued, my friends.

[01:17:54] **Sian Sutherland:** We hope so.

[01:17:56] **Dr. Shanna Swan:** If you'd like to learn more about this episode, please visit [The Great Simplification dot com](http://TheGreatSimplification.com)

[01:18:02] **Nate Hagens:** for references and show notes. From there, you can also join our Hilo community and subscribe to our Substack newsletter. This show is hosted by me, Nate Hagens, edited by No Troublemakers Media, and produced by Misty Stint and Lizzie Sirianni.

[01:18:19] Our production team also includes Leslie Balut, Brady Hyen, Julia Maxwell, Gabriela Slayman, and Grace Brumfield. Thank you for listening, and we'll see you on the next episode.