

Fertility 101: What You Need to Know About Fertility Before, During, and After Treatment

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Fertility 101: What You Need to Know About Fertility Before, During, and After Treatment

Melissa Rosen: Good evening. Welcome. My name is Melissa Rosen. I'm the director of training and education at Sharsheret. I want to thank you for joining us tonight for an important conversation about fertility and cancer. Before we begin, I have just a couple of quick housekeeping items. First, and very importantly, I want to thank our sponsors for this important webinar. We are grateful to the following: Extend Fertility, Merck, the Siegmund and Edith Blumenthal Memorial Fund, and the CDC, Centers for Disease Control Cooperative Agreement, DP19-1906.

They generously enable Sharsheret to continue to provide support and education surrounding genetics, and breast, and ovarian cancers. We have several partners on this webinar. Amazing resources, you should all be aware of. Fertility within reach, which increases access to health benefits for fertility treatments and preservation to alleviate stresses as people strive to build their families.

I was supposed to have a baby which utilizes social media, particularly Instagram to support all Jewish individuals and families struggling to have a child. They provide a warm and nurturing space for those going through infertility, pregnancy loss, infant loss, surrogacy, or adoption. Finally, Jewish Fertility Foundation, which provides financial assistance, emotional support, and educational programs to Jewish individuals, experiencing medical infertility.

Thank you to all of our partners and our sponsors. A reminder that this webinar is being recorded and will be posted alongside a transcript on our website in a few short days. But of course, participants names and bases will not be in the recording. You may have noticed you were muted upon entry. Please keep yourself on mute throughout the call. You can however, use the chat box access to the bottom to ask any questions you might have throughout the webinar.

Those questions, as well as any questions sent prior to tonight will be answered at the end of the evening's program. As a reminder, Sharsheret has been providing support services to the breast and ovarian cancer communities for 20 years. Our resources are 100% confidential and 100% free. Our wonderful clinicians speak with those impacted by breast or ovarian cancer are concerned about genetic risks on many issues, including those related to cancer and fertility.

We also have topical resources on our website and we can often make peer support matches on various issues surrounding cancer and fertility. As being moved into the webinar itself, I want to remind you that Sharsheret is a national non-profit cancer support and an education organization, and does not provide any medical advice or perform any medical procedures. The information provided tonight is not a substitute for medical advice or treatment for any specific medical condition. You should not use this information to diagnose or treat a health problem. Always seek the advice of your physician or a qualified health provider with any questions you may have regarding your condition.

Okay. Let's get to it. We are so incredibly fortunate tonight to have the amazing Dr. Bat-Sheva Lerner Maslow with us tonight. Dr. Maslow is a reproductive endocrinologist in fertility specialist and director of research at Extend Fertility. Extend is a cutting edge medical practice that aims to encourage women to think proactively about their fertility and was the first practice in the country created to preserve fertility. It has since grown to a full service practice even with a special oncology program.

Dr. Maslow attended Albert Einstein College of medicine, earning a medical degree with distinction in reproductive endocrinology. She completed residency training and obstetrics and gynecology at the university of Pennsylvania and a subspecialty training and reproductive endocrinology and infertility at the University of Connecticut.

Dr. Maslow's research has been published in obstetrics and gynecology, fertility and sterility, the Journal Of Assisted Reproduction In Genetics and other key medical journals. Additionally, she writes and lectures on topics related to the intersection of Jewish law and reproduction, and serves as the director of medical education for Nishmat's North American Yoatzot Halacha Program. Okay. With all of that, I welcome Dr. Maslow to the screen and the program is yours. Welcome.

Bat-Sheva Lerne...:

Thank you so much for that introduction. Thank you everyone for being here. I'm really excited to speak with you this evening and share a topic that I'm really truly passionate about. It's really been a part of, one of my life's work to deep dive into the effects of cancer treatment and diagnoses on fertility. What are some of the options available so that women and men who are going through cancer treatment can survive and then thrive and be able to achieve their reproductive goals despite their diagnoses.

So what we're going to cover today is a very brief overview. I know we titled it everything you need to know and it'll be touch upon everything you need to know. But I will preface by saying it is by no means exhaustive. I was just saying before we started that I could literally have a one hour seminar on probably each of these topics.

So we're going to really just scratch the surface. But my goal here is to be able to present, have the breadth of what's available and how important it is that if your life or the life of someone you know is affected by a diagnosis, that the most important thing is to have good counseling, that they should go speak to a trained professional so that they should just assume what's out there because there's so much more that is available than people know. And the technology is improving so much that with every month, every few months, every year, there's new things that become available.

So my goal here tonight is to really just impress upon each and every one of you, what the field is capable of right now, what it could be capable of in future and

how important it is to access that knowledge when you have the opportunity. I'm going to share my screen and we'll get started. Okay. All right.

Okay. You can see my screen, Melissa? Yeah? Great. Excellent. Okay. So like I said, the title is Everything You Need to Know About Fertility Before, During, and After Breast Cancer Treatment. I'm going to focus on breast cancer obviously, but a lot of this is relevant to more general cancer topics. So if there's somebody that if you are life or the life of someone you know is affected by diagnosis, the most important thing to do reach out, have a conversation.

Okay. A few texts facts about oncofertility. Oncofertility is this term that we use to describe the intersection of fertility and oncology. There was a study that was done back in 2012 that showed that fertility is a concern of cancer survivors. AYA stands for adolescents and young adults, but actually we define young adults as going all the way until age 40, sometimes it's age 45. So we can all feel pretty good about some of us still being young adults.

But fertility is really one of the top three concerns of cancer survivors. And it makes sense. Nowadays, surviving a malignancy or a diagnosis is so many more survivors are making it through illness. And then the goal is really to be able to improve the quality of life and get back to a normal life. A life includes having a family. So that becomes a real important piece of the post-treatment survivorship.

What we've learned over the years of paying attention to fertility in cancer survivors is that it's not only about did the chemotherapy cause menopause? Now, we know that in years past when chemotherapy was much more aggressive than it is and less targeted than it is, cancer therapy almost always essentially obliterated fertility and women who underwent cancer therapy, who weren't menopausal, who who still got periods after their chemotherapy, they didn't have periods anymore.

There really wasn't a question about what would happen to their natural fertility afterwards. But now in the last decade, that's not really... Over 40% of female survivors... Sorry. Almost 80 to 90% of young female survivors. Let's say we're going to define young as under 30. They're going to resume getting periods. They're not going to be menopausal following their treatment. But that's not the end of the story. So a lot of times, especially in the oncology world where they kind of see this immediate post-treatment, they're like great the menstrual cycle has resumed. You're good. And the truth is, is that it can follow these survivors long-term and you compare them to either other women, their age or their symptoms. What you see in these studies is that the rates of infertility distant from the treatment.

So it could be five years or 10 years down the line are highly increased. And some of these women will still experience early menopause. Meaning let's say they have chemotherapy in their early 30s. They may end up going into menopause in their early 40s and that's still considered really as a result of their

treatment. So there are these late effects of fertility that are really just becoming more noticed and appreciated. And it's not just about, "Oh, did my periods come back after treatment?"

20 years ago or almost 20 years ago, Teresa Woodruff, who's a mentor of mine started what was called The Oncofertility Consortium. It's really changed the face of the way cancer patients are treated and allows for this collaboration between oncology departments and fertility departments. They recently published their vision statement for the next 10 years. Several of the points were looking at some of the gaps of care that happened to young adults. And like I said, I use young adults very broadly here, but two young adults post-treatment.

Part of the key factors was a lack of awareness of what the options are amongst patients and physicians. So remember, even if your oncologist may not know all the answers, there are doctors out there who do, and part of advocating for yourself is getting some of that information as soon as possible. Lack of referral pathways. This is a major hurdle that I come across often. It's so hard in the midst of almost like a crisis of care and the midst of all the things that need to be taken care of with a new diagnosis. It's really hard to try to add one more thing.

So it often becomes only accessible to those who are really, really motivated. And that's something that as a medical field, we're going to have to work on over the next 10 or 15 years to really create more seamless and easier pathways to get from the oncology office to the fertility office and back. And that's part of the no standardized models of care. It's just every place you go is going to be different. Every place is going to have referrals.

So I'm acknowledging and validating that that is a frustrating weakness to the system. And hopefully one that's going to change over the coming years, but it's all the more underscores my first point, which is if this affects you or affects someone that you love, or you have to really be an advocate and get them to somebody who can give them the information that they need.

I'm going to take one moment to add a little bit of the Jewish communal perspective here. I know that there's some of you for whom this is going to be very relevant, but living in a Jewish community, there's what we call pronatalism like the Jewish community by definition is extraordinarily family driven. A lot of my patient population are single women who are waiting to find their partners, but feel this extraordinary pressure to have a family.

Part of that is because of the major and often wonderful cultural significance that we attribute to having a family. Part of it comes from the first mitzvah, the first commandment in the Torah is to be fruitful and multiply, right? It's sort of built into the system of the Jewish faith and in some ways that holds people back because they feel like, "Oh, they're using these advanced technologies. It

might be considered inappropriate, or there may not be [foreign language 00:14:21] or legal support for it.

The truth is that that's not the case. And this is actually a picture of me giving a lecture at Yeshiva University with Rabbi Willig who's one of the sort of preeminent scholars at Yeshiva University, all about oncofertility, fertility preservation for oncology patients, and this was specifically talking about children and adolescents. But that being the case, there's a lot of support, those avenues of support. So I really just want to take the moment to validate the fact that it's not coming from a pronatalist culture and a culture that so family driven, adds so much extra complexity to these conversations.

The fertility struggles are so much more noticeable. If this is a diagnosis, somebody is undergoing alone or a single person, the changes into their reproductive goals, their dating life can be affected. All of those can be changed and are highlighted and emphasized by the community that we live in from a community that we come to support those of us who are around us. And like I said, I think Sharsheret and some of the other organizations that were mentioned have really done an incredible job of starting that process.

Okay. So now to the nitty-gritty. Okay, I titled this, This is Your Fertility. Fertility, here, we're going to talk particularly about female fertility declines with age. We know that as a fact. Pregnancy rates will start to decline more significantly towards the mid 30s and into the early 40s. By the time a woman reaches her sort of early to mid 40s, natural fertility rates approach zero. And the reason that happens is twofold. One is the quantity of eggs. Women are born with all the eggs will ever have. And eventually we run out when we go into menopause. The other is the quality of those eggs. What is the likelihood that any one egg could go on to produce a healthy baby?

So this is a graph of AMH values. AMH stands for anti-mullerian hormone. It is a hormone that we use as direct marker of egg supply. Now, that's not necessarily a marker of fertility per se, but it's one of the key categories that we look at and younger women, if you look on the left of this screen, younger women tend to have higher AMH. They tend to have a higher egg supply than older women.

There's this natural decline as we age. This picture in the top right hand corner is a picture of an ovary. I like to tell people that ovaries look like chocolate chip cookies. Partially that's because I really like chocolate chip cookies, and I really like ovaries. So it's a good mix of my two favorite things. But on ultrasound, what you see are these little black circles inside the ovary. Each of these little black circles that you were looking at is something called a follicle.

It's like a little bubble of fluid that contains an immature egg. At any given time, there's going to be a group of these at the surface of every woman. And these immature eggs, one will get selected for a natural menstrual cycle and the rest that are at the surface will eventually get discarded and new ones will come. But

when you look at it, younger women tend to have more of these follicles than older women, and that's part of the natural fertility and natural aging.

So that is the very, very brief overview of the decline of female fertility with age. Now, what happens with chemotherapy? Again, we're using AMH or anti-mullerian hormone. And again, I want to state that AMH is not really a reflection of fertility per se. There's lots of women who can get pregnant with low AMH and lots of women who can't get pregnant with high AMH. So it's not the be all and end all. But it is one marker of the egg supply, and it's potentially a marker of how close or how far away somebody may be from menopause, from the end of their egg supply.

So what we see, and this is a great study that was done in Norway, I believe where they followed the AMH values prior to treatment, during treatment, and then after treatment. What you see is that, okay, prior to treatment, everyone falls in a very similar way like you see over here, right? There's sort of the top and bottom tier of where people fall in terms of their curves. And then there's this very abrupt decline during chemotherapy.

Then there's a recovery phase and the recovery phase never truly gets back to where things were before. Then the age related decline picks up. POI stands for premature ovarian insufficiency. That's when the eggs run out prematurely. So what you see is that the likelihood that someone will end up with ovarian failure or ovarian insufficiency after their treatment is to some degree related to what their AMH was before.

So this is true that women who have higher AMHs will have more eggs and a longer chance of fertility after. That's true that younger women will have a better chance, because they also start off typically with more eggs. But you see that the age factors don't go away. That decline continues, but there's this significant drop. So this is where the initial observations of women starting to regain their cycles after chemotherapy. Initially people thought like, "Oh, things are great. On the outside it looks normal." All along here, a woman could be regaining her cycles and things on the surface look great, but somewhere here she's going to start experiencing infertility, and this could be years after her treatment.

I briefly touched upon the difference between or the importance of quality and the difference between quality and quantity. One of the ways we like to talk about it when we give some seminars in our office is that we look at ovaries like gumball machines that when we're younger there's lots of eggs. And most of those eggs are good eggs, so that when you turn the dial and you get one egg at any given month, it's most likely going to be a good egg that has all the right DNA and all the chromosomes and that it's going to lead to a healthy pregnancy.

As women get older, more and more of the eggs become abnormal, and there are fewer eggs overall. So fewer of the eggs bleed to a healthy pregnancy. What we've learned over the years, and this was controversial for some period of

time, but it's pretty much no longer controversial is that chemotherapy actually doesn't affect the DNA and the chromosomes of the eggs themselves. The eggs themselves are not, as many of you may know, chemotherapy affects rapidly dividing cells. The eggs actually don't divide at all. They're completely stable, but the cells that surround the egg, the ones that support it are rapidly dividing.

So the chemotherapy affects these cells that surround the eggs and support them. And if you kill off enough of those supporting cells, the egg itself dies out. So what we don't see is that women who have undergone chemotherapy and who then have babies, they don't tend to have babies that have more birth defects. They don't tend to have babies that have more chromosomal abnormalities. So it's not that they're aging their eggs, or that the chemotherapy is somehow affecting the eggs themselves, they just have a real significant hit to their egg quantity. And that's overall very reassuring because what that means is that there's a lot of options and opportunities for women to be able to reach their reproductive goals, even after cancer.

Here's just another graph that comes from another study that was done here in the United States that looked at different types of cancer and the likelihood of having ovarian failure after chemotherapy and having infertility even if their periods resume. What I wanted to show you is particularly for breast cancer, which is this blue one with the diamonds. First of all, it's very much related to age. And as when we get older, it is much more likely that they will experience infertility as they get older.

Particularly for breast cancer, there's a variety of reasons why that might be the case as opposed to some of the other malignancies, which I won't get into now. But needless to say, it's a very relevant conversation to women who are diagnosed with breast cancer during their reproductive years. Okay. So I say before, during and after treatment. So before treatment, what do you do with a new diagnosis? Counseling.

I cannot emphasize this enough, and I can't tell you how many times I've met people who just assume that whatever it is they need is not available. So it's not only that there's a lot available and there's a lot to talk about more than I could ever talk about in this one session. It's also there's power in knowledge and being able to know what the options are even if the answer is the chance of having a child is unfortunately incredibly small, which thank God I don't have to say very often.

But even just having someone to be able to speak through that and talk through it and understand what that means, what are the alternatives, is empowering and to be able to go through a cancer journey with being more proactive, rather than reactive is something really important that I find that my patients really appreciate. So I cannot emphasize enough how important it is to get on the phone and talk to somebody who has some knowledge that could help you.

Okay. So what are the options? We're going to start with fertility preservation. Reproductive aged woman. However, you determine that. Generally, I would say fertility preservation options are most relevant for women who are, I'm going to say under 40 with a new diagnosis. Between 40 and 45, there are definitely options to talk about, particularly, let's say between 40 and 43. So I wouldn't exclude somebody from that, but certainly if you're talking about a diagnosis and a woman under 40, it should be mandatory that these women have some kind of conversation about fertility preservation, even if they decide not to do it, having the knowledge is incredibly important.

So what are the options for fertility preservation? One is egg freezing. Egg freezing is a great option for women who are single or don't have a partner. Egg freezing is a process that used to be considered experimental. But for the last almost 10 years has been considered a standard of care. It's now readily available in lots and lots of places like was mentioned except fertility. The practice that I work at was really the first practice that was built with a program specifically developed to help women freeze their eggs.

We have a lab that is incredibly talented and is using the latest and greatest techniques for egg freezing. But the technology has improved drastically from what people have heard about in the past and is really an excellent option available for either one. Like I said, a woman who is single. Sometimes egg freezing makes more sense than embryo freezing for couples. Even if they're married. Sometimes it's faster. Sometimes just to get egg freezing. So if you're crunched for time, or if the partner is crunched for time, there's also the consideration of what we call disputed embryos.

So when an embryo is created that embryo, for lack of a better term is owned or parented or is in custody of the two parents that made that embryo. And if something were to happen to that relationship, that embryo is essentially no longer usable unless there is express consent from the other party. And even in that case may not be.

So there's an example. This is one sort of devastating extreme example of a physician actually in Arizona. She was diagnosed with breast cancer. She and her husband froze embryos. She underwent treatment. They then got divorced. She went into early menopause. She met another person. They got married at the time she 40. I mean, she was not too old to have family, but she no longer had viable eggs. Her ex-husband was not allowing her to use their frozen embryos that the two of them created.

It went through the court system and ultimately the court system sided with the ex-husband because in this country, and truth isn't even in most countries around the world, you can't make somebody a parent against their will. And that ex-husband was essentially going to be the genetic parent of the child. So you can't force somebody to be a parent.

So I actually as uncomfortable and unpleasant as it is, have this conversation with all of my patients, because going into a treatment like this where there's a possibility of really having either no fertility or a significantly diminished fertility in the future, you have to think about some of those options. I've had patients who have frozen both eggs and embryos. If they have enough, that depends on how much they're going to get. Some women are going to get a lot of eggs. Some are not going to get as many.

So these are complex nuanced individual conversations that are important to have. Embryo freezing means you take the egg, you fertilize it, you develop it to the final embryo stage, and then you freeze it at that point. There's a lot of advantages to doing that because the embryos can be tested. So you can know a lot more about the likelihood of success with those embryos. So you can feel a lot more confident about what you have frozen. So there are a lot of advantages to freezing embryos if you have the opportunity. But like I said, there are some disadvantages too.

Ovarian tissue cryopreservation is sort of the new up and comer in the fertility preservation space. That's where literally a piece of the ovary is taken out and preserved, and then put back in later on at some later date. This is mostly still experimental, although it's lost its kind of experimental label. So it doesn't have to be experimental.

What I mean by experimental is that it has to be at a possible with an IRB and experimental protocols have to be that way anymore. It's generally used for children or young adolescents who have either not gone through puberty or who are not going to be able to tolerate the stimulation and all that, but its uses are broadening. And it may, I think in the future be more readily available to people who don't have the time to go through the egg freezing or embryo freezing process. This can be done in a single day, but it requires a surgical removal of the embryo tissue.

Okay. Very briefly. What is the process of doing fertility preservation? The timeline is generally about two weeks which in some ways people are like, "Oh, that's so short." But when there's a new cancer diagnosis, the timeline becomes a very important. Sometimes that timeline is no big deal, but I have patients who are going to have... They're still in the midst of their diagnosis. They're going to have another excisional biopsy. Then they were going to have surgery.

It might be four to six weeks before they're thinking about starting chemotherapy and we don't have to rush it at all and others where it's they need to go tomorrow and the two weeks may not be enough. They may not have the time. But it's relatively, I would say roughly about two weeks. Generally when I'm not pushed for time, we typically start with the beginning of the period, but we can modify these, and I tell my cancer patients this all the time, like we do the best we can of what we have, right?

It may not be ideal, but we will do everything we can to make the best outcome for the resources that we have. So we may not have the resource of time to wait until the next period, but we modify and we start with where we are. And most of the time we still do well. So even if it's not going to be perfect, it's going to be as best as it can be. I make special modifications for patients with breast cancer as well. There's medications that we can add that can keep the circulating estrogen levels low so that we're really mitigating as much as possible the risk of this process aggravating the malignancy and aggravating the cancer.

Is that true for everybody? No, that's always going to be a risk, but it's generally an acceptable risk. And that's part of the conversation that once we sort of create our team with the fertility specialist and the oncologist that that's a conversation that has to be had. The process I put here, because this picture shows all the different things. So it shows a natural conception, which is the ovary matures and egg. It ovulates. It meets sperm. It divides into an embryo and then it implants. When we do it in the lab, what will be assisted sort of our technologies that we do is that we give exogenous hormones.

We have hormonal injections. That's stimulate the ovary to grow many eggs, not just one. Then we retrieve those eggs and we try to mimic the same process, but in a Petri dish. And here what we would do is we actually would freeze the embryo or the egg and then continue the remainder of the process when it's safer.

Here are some photos like actual photos from the lab. This is, remember the picture of the ovary that I showed you before, where all the little chocolate chips were little, when we stimulate the follicles get really large. This is kind of mid stimulation. Then we remove the fluid that's in the follicle when we do the retrieval and you get this clear yellow-y fluid and in it is the egg that's floating. So this is the egg that's floating. All these little bubbles that you see around it are those cells that support the egg, the granulosa cells.

So those are the supporting cells I told you that are more effected by the treatments. Okay. During treatment. So once treatment starts, what kind of important things are there to consider in terms of fertility. So this is kind of backwards where here I'm not really talking about fertility, but these are important things to think about. One is that often during treatment people will experience menopausal symptoms. I skipped one thing. Alternatives. So sometimes it's just not an option. Fertility preservation, we don't have time or even if we do, what additional things can we do to protect the ovaries from the effects of chemotherapy.

One is a medication called Lupron or Depot Lupron. What that does is really suppressed the entire reproductive system and essentially create a medical menopause. But as the ovaries quiet down, then those cells, the granulosa cells are not as active, and they're not as impacted by the treatment. Now, if this was a perfect treatment, we would totally do that instead of all this 14-day

craziness, but it's not. It's not perfect, but it's reasonable as an alternative if this isn't an option.

I often do it in addition. So once we do all of this and we preserve the fertility, I also try to protect the fertility. But what that does is often create menopausal symptoms. And even in women who don't take that Lupron treatment, they often will, will experience menopausal symptoms, because remember I showed you, there's a very steep decline in the ovarian function during treatment. And the ovaries are what produced the hormones that make us not have menopausal symptoms.

So things like hot flashes, vaginal dryness are very common during treatment. The unfortunate thing is in the general public, we treat menopausal symptoms with estrogen, which we really can't do, particularly during breast cancer treatment. But there are some non-hormonal methods that can be used. So it's important to also bring them up because like I said you don't have to suffer. It doesn't have to always be that way.

So a good gynecologist can also help you deal with some of these symptoms in a way that's still safe during treatment. The other thing I bring up which sounds totally backwards is contraception. Actually, one of the ways I got into this as a passion project was during my residency like my first research project I ever did was on inception during cancer treatment. I compared breast cancer treatment to other malignancies, and I worked with the oncology department at the University of Pennsylvania. It's still actually one of my most cited papers because it's not something that people talk about frequently.

The assumption is... Oh, if I had this consultation about how I have to preserve my fertility then I must not be able to get pregnant. And that's not actually the case. And there are some good studies to show that unfortunately, there are unintended pregnancies that have happened either during treatment or shortly thereafter. And that's obviously a very, very challenging situation, particularly for women with breast cancer, because pregnancy comes along all sorts of hormones that can be an issue. And that brings up all sorts of conversations about the termination and pregnancy, and a lot of complicated things.

And the better thing is to not be in that circumstance of having an unintended pregnancy, if that's not your intention. So it's important to think about contraception too. So I know it sounds a little bit backwards, but it is an important thing to think about. And often, particularly for women who have breast cancer, many of these options are off the table, right? So oral contraception like birth control pills, the ring, the patch, those are all off the table. For couples who are Orthodox and observant, some of these other options may also be off the table like condoms and other methods.

So it's a complicated situation. I've had circumstances where we did an egg retrieval and an IUD placement at the same time. The IUD, the intrauterine device tends to be a real favorite amongst women with breast cancer, because

it's forgettable. You don't have to remember to take something every day. It's extraordinarily effective, it's safe. There are ones that are hormone free. There are ones that have low hormones that have been studied in breast cancer that are saved. So this is another conversation to have and an important one, and it is nice to just not have to worry about it if you can.

Okay. Moving on. After treatment, what happens after chemotherapy. Remember that there's that rebound where the ovarian function starts to return. And so often in particularly younger women. So we're talking to women in their 20s and early 30s, and maybe even their late 30s. They're going to get their periods back pretty soon. And everything will sort of appear to be back to normal. What happens then?

So one of the things, and this is a kind of a new innovative approach that I've taken with some of the oncologists that I work with is thinking about what I call interval fertility preservation. For somebody who didn't have the opportunity to preserve fertility before treatment, or maybe she did, but it wasn't as many eggs as she was hoping, or as many embryos that she was hoping, that window, not immediately after treatment, but shortly after treatment, when things start to recur, things start to resume is actually a great time to do it again, to think about fertility preservation again, because it may not be as good as it was before, but it's going to be as good as it is going forward.

It's another opportunity to really think about preserving eggs or embryos if they didn't have the opportunity to do it beforehand. So sometimes if things are crazy. This is true a lot in adolescence. So thankfully that's not a huge issue with breast cancer, but I have adolescents who have lymphoma or leukemia and it's a lot to handle. I say, "You know what? I've given you all the information. Let's not do this now." Let's wait two years and we'll do it. So that's always an option. It's not one that people think about much because it is a novel approach that hasn't really made it out into the public much yet, but I'm putting it out there for you guys as a resource.

But getting pregnant after treatment is a big, huge topic, particularly for breast cancer. Getting pregnant naturally or getting pregnant fertility treatments, it's a huge topic. It's something that comes up a lot. A lot of it is based around timing. And that's obviously critical, especially for those who are going to be on some kind of suppression treatment after their initial chemotherapy or surgery, right? Those are going to be on Tamoxifen or Arimidex, or they're going to be on Herceptin, right? Some of these are treatments that are going to continue for years after the initial treatment and are generally not safe in pregnancy.

So do you go off those suppression to get pregnant? Waiting five years in somebody [inaudible 00:39:39], right? Getting pregnant at 40 is very different than getting pregnant [inaudible 00:39:44]. And that goes back to those initial charts about what are the chances of getting pregnant at 35 versus 40 is actually quite drastic.

So that's again, where those conversations about fertility preservation. Somebody might have eggs or embryos frozen, and then those five years of Tamoxifen is in a very different place than somebody who doesn't. And obviously, underlying all of this is the question of is pregnancy going to somehow risk a recurrence? It's a complex conversation. There are some really great studies that have just come out and some that are undergoing right now. Kind of my go-to on these types of topics is a physician in Italy. His name is Mario Lambertini or Martino Lambertini. He is a breast cancer oncologist with a real interest in fertility in general, and he's doing some great studies.

So this first study was done primary breast cancer patients and looked at their communities in Korea and showed that women who underwent pregnancy after treatment didn't change their recurrence risk or survival rates didn't change. So generally the pregnancy itself could affect their cancer or their risk of recurrence.

It also didn't show any differences in pregnancy outcomes, whether they were done closer to treatment or further away from treatment. So this is all very reassuring showing that the treatment itself doesn't necessarily affect the pregnancy and the pregnancy itself doesn't necessarily increase the risk of recurrence. And this study looked at BRCA mutations, women who don't have a diagnosis of cancer and looked at their pregnancies to see, "Okay, these are women who are potentially at risk for cancer. Could their pregnancy increase their chances of actually developing a cancer and they showed that they did it."

So that was also a really important study. There's another study going on right now, one in the European Union and one in Canada, I believe. And I'm going to get their names mixed up. It's like the promise study and the protect... Something with PR or something. I think one is the promise where they're looking at giving women opportunity to go off their suppression medication for some period of time.

So they give them a break. Let's say after two years, they take a two-year break to get pregnant have a baby and then go back on their suppression treatment. They haven't published a study yet. I don't think they finished recruiting, but the initial data is really very reassuring that that can happen in a safe way. So it's something, again, not going to be for everyone. There's going to be a lot of individual adaptations, but these are all really... This is new data that's coming out that's overall very reassuring about the goals of being able to have a family and having a pregnancy safely after breast cancer.

Something that comes up a lot when I talk about fertility preservation or what are the success rates. Now, I don't have a time to kind of go deep into the success rates here, but what I want to emphasize is that the success rates with frozen eggs are frozen embryos are better now than they ever were before. This data that I have up here is actually old. The new data comes out every year, and these are data that's actually a few years old, but generally the success rates are

much better than they ever have been. And the biggest factor is the age of the eggs.

So the younger a woman is when her eggs are harvested, the better the chances that she's going to have a baby with those eggs whether they're fertilized now or they're fertilized later, or they're used soon, or they're used much later. Just to oversimplify it, that's the most important piece of all of this. And that's why fertility preservation discussions are so important because if this [inaudible 00:43:47] at 35 or 36 as opposed to 41 or 42, the difference is going to be drastic.

If you look at the green bar here, even the difference of 38 and 42 is drastic.

I wanted to take the last few minutes and I'm going to leave. I'm going to leave 10 minutes for questions, but I want to take the last few minutes to talk about just some specific considerations for women who anxiously adamant who are BRCA positive. BRCA, there's kind of two things to talk about here. One is somebody who's already has a cancer diagnosis and others who might be at risk for cancer diagnosis.

I'm going to talk about the at-risk population first. So women who are diagnosed with BRCA and nowadays that testing is happening much more frequently, and at younger ages. So you can have women who are in their 20s who are finding out that they are carrier for BRCA, it has to affect their reproductive life whether they want to admit it or not.

It's imperative that we start talking about the fertility considerations for these young women. So one is that at some point someone may recommend risk reducing surgery, mastectomy, frenectomy, removing the ovaries. Now there's discussions of what we call a salpingectomy, which is moving the tubes and then removing the ovaries later. Those are all things that are going to come into play as we get towards the end of the reproductive years. And unfortunately in the oncology world, they don't necessarily think of 35 and 40 as being within the reproductive years.

But the reality is that there are many women who are, one, either just starting their families at 35 or 40, or there are women who would love to be able to grow their families at 35 or 40. Not only is it [inaudible 00:45:49] that between 35 and 40 is a time where we really are reproducing and it's extraordinarily disruptive to their reproductive plans to start talking about removing their ovaries at 35 or 40 and sort of dismissing the fact that that means that they may no longer have children.

So if you think about things like fertility preservation for women who are BRCA positive, who may at some point down the line have to have their ovaries removed, you're like the whole perspective can change because you can freeze eggs when they're still good and they're young and you can get lots of them.

Let's say in the early 30s and then have your ovaries removed at 35 and then still get pregnant with your frozen eggs because you don't actually need ovaries anymore once you have your frozen eggs, because the eggs get fertilized in the laboratory and then are put in the uterus and we can actually safely replace the hormones that the ovaries would have produced.

Now, this is like mind-blowing, but it's something actually that can be done relatively easily. This is another area where people don't even think about it. It's not even being thought of. I put this little blurb on the bottom here. This is the paper that actually is coming up that I published. That's going to be in the Journal of Cancer Oncology practice.

You see, I had to submit my revised manuscript last month. So hopefully it'll come out in the next few months where we really kind of detail some of these considerations and why it's really important for young women, particularly if they're diagnosed in their 20s and 30s that are BRCA positive, to talk to somebody about fertility preservation.

The other piece of this that's particularly important for both men and women who are carriers of BRCA whether they have cancer or at risk for cancer is pre-implantation genetic testing. So pre-implantation genetic testing or PGTM, which is pre-implantation genetic testing for mutations, it's what we used to call PGD which is pre-implantation genetic diagnosis. The nomenclature has changed a little bit is the ability to biopsy embryos which is this picture that I showed here.

This is a fully formed blastocyst embryo where a small portion of the outer cells are being biopsied or taken off safely. It doesn't affect the embryo itself. And these cells can be tested. They can be tested for a variety of things, so they can be tested for chromosomal abnormalities that we talked about before, but importantly, they can be tested for particular mutations.

So there is the option for those who are carriers of BRCA, known carriers of BRCA to use assisted reproductive technologies as a way to prevent transmitting the gene to their offspring. Now, this is complicated and nuanced and to some controversial. Obviously, it can be expensive and we didn't even touch upon some of the cost considerations that probably a question someone will have.

So we can touch upon the questions. This is a whole new paradigm of thinking about somebody who's not necessarily infertile who doesn't have a risk to their fertility, but utilizing fertility treatments as a way to prevent the transmission of a mutation is complicated. I will say I have more and more. I have patients who are coming to me who have family history of malignancies, who are known BRCA carriers, who are coming to do PGT in order to prevent having children who will have to go through some of similar experiences they have.

The success rates I said are better now than they ever been. There's been this huge inflection in the ability to do this kinds of testing over the last five years where the testing itself is so much more reliable, but it's limited by the age of the eggs. So the younger the eggs are that are being used, the more likely it is that they're going to find an embryo that's both chromosomally normal and healthy enough to go on to produce a healthy baby and not a carrier.

Remember BRCA, you only need one copy. So that means 50% of the offspring are statistically going to be carriers. So the younger that this is done, the more options, the more eggs, the more embryos, the more there is available to be able to ensure that you could get a baby out of this. I was just talking to a geneticist in preparation for this study, like a pre-implantation geneticist. He was saying that with the technology these days, if you have a 30 year old who's doing PGT, you could basically... There's never a guarantee, but he's like, "I'm 90% sure that I could get them a normal embryo that's not a carrier."

But if you have somebody who's 40, it's almost impossible because they tend to not make as many eggs and the exit they make tend to not be as good. So to be able to find one that's both a healthy egg and not a carrier is very, very, very challenging. So that underscores again, getting the information to people as early as possible so they can make these decisions in a way that's going to give them the most options. And that's part of what's my motivation for writing this paper is to get that information out to the oncology world. And one of my motivations for speaking to you today is to get some of that information out as well.

Again, I'm going to tell you right now that I did not do justice to this topic. There's a lot more that we can talk about. I'm happy to answer some questions, but the specifics and specific instances and people's specific situations it's going to vary. This is my best ability of giving as much information as possible to as many situations as possible.

Melissa Rosen: Thank you so much. You're right. That was so much information. And I definitely have questions. I saw some questions come in and we have questions that came before. So let me ask you to unshare your screen so people can see you as you answer questions. Awesome.

Bat-Sheva Lerne...: Okay.

Melissa Rosen: Okay. So I'm going to be really honest and say that the first question I have is clearly a plant, but I want this to be reiterated. So if someone is going through the diagnostic process and the doctor doesn't mention fertility preservation to them, should they assume it's because that's not an option for them.

Bat-Sheva Lerne...: I'm going to say no. Like I said, never make any assumptions. It may not be an option, right? That may be the case, but I can't tell you how many circumstances I've been in where people just make it. It's easy to make those kinds of

assumptions, right? This is a high stress, high emotional situation. It's just so natural to be able to say, "Okay, it must be. It's not an option."

In a way it's easier. It's like, "Okay. It's one less thing I have to deal with." But the future you will be much happier if you were able to have that conversation even if the [inaudible 00:53:09] Right? So just understand why it's not an option. I would say, Jeff, like I said, for somebody who's under 40, it should be obligatory that they have the conversation. Between 40 and 45, we can argue what the right age cutoff is. And over 45 unfortunately probably isn't an option for many, but women under 40, it has to be a conversation. And if the oncologist doesn't bring it up, either the patient should bring it up or go out on her own, but there has to at least be an acknowledgement that there needs to be a conversation.

Melissa Rosen: Thank you for reiterating that. We still hear from women who haven't heard that from their doctors while they're in the diagnostic process. Okay. A couple more questions. So you talked a lot about how chemotherapy impacts eggs or in fact luckily doesn't so much, but what about other cancer treatments? What about radiation and any other medicines, immunotherapy, things like that.

Bat-Sheva Lerne...: Yeah, that's a great question. I focus mostly on chemotherapy because that does have the biggest impact on fertility. Radiation, thankfully, especially now they're so good at pinpoint. The world of radiation oncology has also just... With the advent of computers, they're building these computer models to be able to target the radiation so much better than they ever could. So let's say radiation to the breast is very unlikely to affect fertility because the pelvis and the ovaries are going to be well-protected.

Radiation directly to the pelvis is for sure can affect the ovaries, but it comes up thankfully less commonly. Even ovarian cancer tends to be more surgical and chemotherapy, less radiation. But yes, radiation directly to the pelvis could absolutely affect fertility in somewhat different ways, but it tends to be similar and that it causes a very acute insult to the egg supply.

Melissa Rosen: Thank you very much. Okay. Another question we received was, are there any supplements that can really help after treatment to encourage the return of fertility? This person said she's heard pineapple, Maca, other things. So let's hear your thoughts on that?

Bat-Sheva Lerne...: There's a lot out there. There was a bad meme I put up about looking stuff on the internet. The internet is chock full of all sorts of things. When push comes to shove, there probably isn't something that's really going to drastically changed the trajectory. It's going to kind of do its own thing. The same way your eggs have been living with you your whole life. There's not much you're going to be able to do that's going to really alter them. Some of those things are good. I mean, a pineapple, some people like pineapple, I wouldn't. Maca, you have to be careful also.

Some of these supplements, especially these fertility supplements, they're not necessarily regulated. Some of them contain plant-based hormones. So for somebody who is concerned about being at risk for breast cancer or recently treated with breast cancer, they have to be really careful with what they're buying even though it says natural. There's some things in there that could be worrisome.

Melissa Rosen: Someone asks about IVF cycles and their relationship to ovarian tumors, their borderline ovarian tumors. Is that something that happens?

Bat-Sheva Lerne...: I would say this was a topic of conversation probably like in the late '80s and '90s. A lot of concern about either fertility treatments in general or IBF, somehow put people at risk for ovarian cancer in big studies that have been done where they looked at huge population based instead of just looking at small groups. Often these are done in like Scandinavian countries where they have big databases of every single birth that's happened in the country and every single cancer treatment and every single fertility treatment.

But they're really not seeing an increase in cancers related to fertility itself. It is true that women who don't have babies who go through their reproductive lives having not had a baby are more at risk for certain cancers. And those are women who also end up in fertility clinics.

So there's a population here that's skewed. The other thing is that some of these ovarian tumors get picked up at the fertility clinic because they're getting scans much more frequently. So that doesn't mean that the fertility treatments caused the tumors, they got picked up much earlier. So thankfully, reassuringly, the more recent studies have really demonstrated that there's not an increased risk and most oncologists will feel very comfortable recommending fertility treatments. Like I said, there are some modifications we can do, particularly for women with breast cancer, but that generally is not a concern.

Melissa Rosen: Great. Okay. Two more questions. You alluded to this, so just confirm what I think you just said. Someone asks if pregnancy and breastfeeding are protective for breast and ovarian cancer diagnoses and in general, but particularly with a BRCA1 mutation?

Bat-Sheva Lerne...: In general, it is protective to some degree. I don't know the actual numbers when it comes to the BRCA1 mutation. BRCA1 mutation is a risk. It's an added risk. I don't know how much pregnancy and breastfeeding sort of counter balance that. I'll be honest. I don't know the answer to that.

Melissa Rosen: Okay. Thank you. Last question. So someone asks and I'll remind you that this is not a direct medical advice, but you might be able to give a sense here of other questions you might ask or something. Someone says that a 24-year-old froze 22 eggs. In the future, she wants to screen them as embryos for BRCA before

implantation. Is that enough or should she plan to harvest additional eggs after treatment to have enough to do this screening?

Bat-Sheva Lerne...: Okay. Even though that's a specific question, that actually opens up a nice conversation for sort of a general topic that comes up all the time when we talk about fertility preservation is like how many eggs is enough? To some degree, it is an impossible answer to give, or a possible question to answer because it's related to... Well, how many eggs is realistic? 22 eggs is not going to be realistic for everybody. That's a great response. So I'll start off with that. 22 eggs from a single cycle is excellent.

But we're going to be limited by what everyone's physiology is going to be. So that may not be feasible for everybody. It may not be feasible for everybody to do multiple cycles to batch the other number of eggs because that takes time. It takes money. It takes energy. That gets expended. So it's a complicated answer, but to give some broad strokes, let's say 10 eggs for somebody who's under 30 is about a 70 to 75% chance of at least one baby. But if you add the BRCA screening, it cuts it in half.

So that's about, let's say 35% chance of at least one baby. Between 30 and 35, 10 eggs is about a 60% chance of at least one baby. And again, BRCA you're going to cut that in half. Between 35 and 40, 10 eggs is about a 50% chance. And 40 and up, it's more like a 30% chance of a healthy baby. And then if you add BRCA, you cut it in half. So now you see how important it is to one, get a number of that, try to get a lot of eggs. And when they're younger, those eggs are much more likely to be successful.

So 20 eggs in somebody who's, let's say under 35 is like a 50% chance of one baby that's BRCA negative. Now, that's looking at a big population. There's going to be some couples who could have multiple babies who are BRCA negative from 20 eggs. And there's going to be some who have not. It's going to be like a bell curve.

So here's really where we play statistics and we have to really counsel people individually. So whether or not it makes sense to do this again is going to depend on all sorts of individual factors, but that's some broad strokes of numbers that I think are useful for people, and again, underscores how important it is to start talking about these things younger. So you have more options and more knowledge.

Melissa Rosen: Right. So you didn't have a specific answer, but you've certainly given them the right information to begin thinking about, which is perfect. So I would love to ask more questions, but unfortunately we are close to the end of our time. So I want to start to finish by thanking Dr. Maslow for her sensitive and incredibly important presentation. Once again, I want to thank our sponsors, Extend Fertility, Merck, the CDC, and the Siegmund and Edith Blumenthal Memorial Fund. And our wonderful, wonderful partners, Fertility within Reach, I Was Supposed To Have A Baby and the Jewish Fertility Foundation.

Fertility 101: What You Need to Know About Fertility Before, During, and After Treatment

Please take a moment in your chat box right now. There's some links there. If any of our partners are up there and want to put their links in, their websites in, that would be great. But right now what's there where you see Survey Monkey is a link to a very brief evaluation poll.

I'm going to ask everyone to take the time to do it. It's going to take two minutes. These evaluations really do inform future programming. In fact, you can click now and still listen to me say good night. I want to remind you that Sharsheret is here for you and your loved ones to provide emotional support, mental health counseling, and other programs designed to help you and your loved ones navigate the cancer experience. All are completely free, completely private, and one-on-one.

You can reach out to us through our website which was just up on the chat or by emailing [clinicalstaff](mailto:clinicalstaff@sharsheret.org), also right there, [@sharsheret.org](https://www.sharsheret.org). And as we finish, I just want to say we have one more program this week. For those who are interested, we're having another exciting Shalom Shabbat program this Friday, the 20th, 12:30 Eastern, 9:30 Pacific. It's open to everyone. So please consider joining us for an opportunity to reflect, to reset as we move into the sabbath, Shabbat, the weekend, and for those who celebrate the fall Jewish holidays. And there will be, or there just was a link to register in the chat box now. Thank you again to Dr. Maslow. Thank you for joining us and have a wonderful night. Good night.

Bat-Sheva Lerne...: Thank you so much for having me.

Melissa Rosen: Bye-bye.

About Sharsheret

Sharsheret, Hebrew for “chain”, is a national non-profit organization, improves the lives of Jewish women and families living with or at increased genetic risk for breast or ovarian cancer through personalized support and saves lives through educational outreach.

With four offices (California, Florida, Illinois, and New Jersey), Sharsheret serves 150,000 women, families, health care professionals, community leaders, and students, in all 50 states. Sharsheret creates a safe community for women facing breast cancer and ovarian cancer and their families at every stage of life and at every stage of cancer - from before diagnosis, during treatment and into the survivorship years. While our expertise is focused on young women and Jewish families, more than 15% of those we serve are not Jewish. All Sharsheret programs serve all women and men.

As a premier organization for psychosocial support, Sharsheret’s Executive Director chairs the Federal Advisory Committee on Breast Cancer in Young Women, Sharsheret works closely with the Centers for Disease Control and Prevention (CDC), and participates in psychosocial research studies and evaluations with major cancer centers, including Georgetown University Lombardi Comprehensive Cancer Center. Sharsheret is accredited by the Better Business Bureau and has earned a 4-star rating from Charity Navigator for four consecutive years.

Sharsheret offers the following national programs:

The Link Program

- Peer Support Network, connecting women newly diagnosed or at high risk of developing breast cancer one-on-one with others who share similar diagnoses and experiences
- Embrace™, supporting women living with advanced breast cancer • Genetics for Life®, addressing hereditary breast and ovarian cancer
- Thriving Again®, providing individualized support, education, and survivorship plans for young breast cancer survivors • Busy Box®, for young parents facing breast cancer
- Best Face Forward®, addressing the cosmetic side effects of treatment
- Family Focus®, providing resources and support for caregivers and family members
- Ovarian Cancer Program, tailored resources and support for young Jewish women and families facing ovarian cancer • Sharsheret Supports™, developing local support groups and programs

Education and Outreach Programs

- Health Care Symposia, on issues unique to younger women facing breast cancer
- Sharsheret on Campus, outreach and education to students on campus
- Sharsheret Educational Resource Booklet Series, culturally-relevant publications for Jewish women and their families and healthcare Professionals

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