Fight for Sight Presents: Better diagnosis of retinoblastoma with Dr Amy Gerrish and Katie Elliott

[00:00:00]

**Emma Blamont:** Okay. Good afternoon, everyone. Welcome. Thanks for joining us today for our in conversation with Dr. Amy Garish, Dr. Helen Jenkinson and Katie Elliott. In today's webinar, we'll be hearing about Amy's work in diagnosing childhood eye cancer. We'll also be hearing from Helen about how this research might translate into clinical practice.

**Emma Blamont:** And Katie's here to tell us about her lived experience of having childhood eye cancer. So before we get started, we have some housekeeping reminders for you. There will be live captions available during the webinar as always. The slides, the transcript, and a recording of the webinar will be made available to you after the webinar.

**Emma Blamont:** Please don't feel like you have to hurriedly write notes, you'll get all the information afterwards. And that's it. This also includes people who haven't quite made it to the webinar today. So if you have any colleagues who intended to come [00:01:00] and couldn't they'll have access to everything too.

**Emma Blamont:** There will be a Q& A session towards the end of the webinar, if time permits, so please use the Q& A window within Zoom to ask any questions you have as we go along. We'll probably be asking, answering the questions in a first come, first served order. And after the webinar, we'll be sending you an email, which will include a survey.

**Emma Blamont:** And we'd be really grateful if you could complete this, please, because it helps with planning. feature webinars and gives an understanding of the type of topics people enjoy and format. Okay. So, now on to a little bit more of information about the webinar and me and our speakers. So I'm Emma Blamont.

**Emma Blamont:** I'm the head of research and programs at Fight for Sight. And I'm joined today by Dr. Amy Gerrish, Principal Research Scientist at Birmingham Women and Children's NHS Foundation Trust. Amy researches a type of eye cancer called retinoblastoma, and she's received two [00:02:00] grants from Pipe and Sight for her work.

**Emma Blamont:** She first received a small grant, which was co funded by the Childhood Eye Cancer Trust, and more recently a larger project grant. We have Katie Elliott, who was diagnosed with retinoblastoma when she was four years old. She's going to share her story with us all, and she's really keen to hear about what current research holds for the future for children.

**Emma Blamont:** everyone. like her. And now, and finally, last but not least, we have Dr. Helen Jenkinson. Helen's a paediatric oncologist who can help shed light on how research like Amy's might translate to improvements in clinical practice. Before we kick off with the in conversation part of the webinar, I'm going to tell you a little bit about us.

**Emma Blamont:** We're Fight for Sight. We fund the brilliant minds and bright ideas that put change in sight.

**Emma Blamont:** I'd like you to imagine for a moment, this is our brand story. Imagine that being told that you or someone you love is losing their sight. At that moment, you'll [00:03:00] probably have two profound questions, which are, how can this be stopped or can this be stopped? And how do I live my life? So we aspire that our work as a charity will help answer those questions.

**Emma Blamont:** Over the next five years, we plan to distribute 30 million in grants. Across our scientific research and social change funding programs in the hope of saving sight and changing lives for those affected by vision loss.

**Emma Blamont:** So today we're going to be focusing on our scientific research funding program. Our researchers are working to better understand, diagnose, prevent and treat vision loss. So before we hear from Dr. Gerrish and Dr. Jenkinson. We're going to hear we're going to start with Katie to hear more about her experience of having retinoblastoma.

**Emma Blamont:** So just a reminder, there will be a Q& A, so please put [00:04:00] any questions you might have for your speakers in the Q& A window.

So you're an ambassador for Fight for Sight. You were diagnosed with retinoblastoma at age four. Would you, are you able to tell us a little bit more about, what it was like for you at that time, your memories of receiving treatment, and maybe you didn't know much about the diagnosis at that age, maybe it was your mum and dad.

**Emma Blamont:** Yeah. Yeah.

**Katie Elliott:** Obviously being so young and being diagnosed with retinoplastoma at the age of four my memories Distant, but some of them are still there. When I was diagnosed, my mum never really heard anything about retinoblastoma before. So she's obviously going onto the internet, and Dr.

**Katie Elliott:** Google is telling her all these things. When she was, when I was diagnosed and she was told it was retinoblastoma she got told off the doctors that It [00:05:00] is probably a very high chance that I'll lose my eye. Yeah. That's what she has told me. Some of my personal memories is actually going to the Royal London.

**Katie Elliott:** And in the playroom there used to be this pink gaming console. And that's one of my core memories, playing with that. I also remember asking for a pink sparkly prosthetic eye I was told no at the time, but I'm actually on the search for someone who can make me one, which is very interesting.

**Katie Elliott:** I also remember going, when I was going through my chemotherapy, I remember some of my senses, such as my smell changing, I used to always, after my hospital appointments, I always used to get treated to McDonald's. So the smell of [00:06:00] certain foods was actually making me be sick, which isn't obviously ideal.

**Katie Elliott:** So that's one of the bad memories that I've got. Another core memory, and I've actually got quite a lot of pictures is dressing up in the play room, waiting for the doctors to come and get me, so that's some of my memories from being treated with retinoblastoma.

**Emma Blamont:** I think that's the sort of important role that the hospital has too, in making young patients feel really comfortable and at ease as well, it's nice to hear.

**Emma Blamont:** You're not a lot older, but you're older than you are, you were aged four. So what made you want to stay in touch and become an ambassador for Fight for Sight?

**Katie Elliott:** So when () Sarah, Head of Comms and Public Affairs reached out to me in August, September time last year to [00:07:00] be an ambassador for Fight for Sight, I was really excited.

**Katie Elliott:** I knew straight away that becoming an ambassador for the charity helped my dedication to awareness with sight loss and retinoblastoma and obviously Fight for Sight's mission to preventing blindness and funding research, it all really stood out to me. Obviously growing up with sight loss made me aware of how important it is for, obviously, early diagno a diagnosis with rent a blastoma and obviously other eye conditions.

**Katie Elliott:** So when Sarah asked me to become an ambassador, I jumped at the opportunity, should I say. So yeah, that's how I wanted to be an

**Emma Blamont:** ambassador. That's a really nice story, Katie. Thank you for sharing that. I'm gonna, there's one question in the Q& A which I'm going to ask now. I'm going to break the convention just because it might [00:08:00] help people going forward with the webinar.

**Emma Blamont:** So somebody's put in the chat they just asked if they could ask what year you were diagnosed with retinoblastoma, if you might, If you could share that please.

**Katie Elliott:** Yeah, so I was diagnosed in 2007 which is a couple of years ago now. Yeah. So I think the treatment lasted near enough until 2008, going into 2008.

**Katie Elliott:** And then I think I got the all clear either end of 2008. A or 2000 of start 2009.

**Emma Blamont:** Thank you. So yeah, you had it. So yeah, those sort of first years of school, you were undergoing treatment as well, which must have been difficult for you. Yeah.

**Katie Elliott:** Yeah.

**Emma Blamont:** And you and your mom to manage as well. Okay. So I suppose look into the future really, and, making it a sort of better future for children who might be receiving diagnoses [00:09:00] like the one you have had.

Dr. Garish is a researcher who's been funded by Fight for Sight and whose research hopes to enable a better diagnosis for future generations. Are there some questions you'd like to ask her and Dr. Jenkinson?

**Katie Elliott:** Yeah Amy, what led you to a career in retinoblastoma research?

**Dr Amy Gerrish:** Hi everyone for starts.

**Dr Amy Gerrish:** I guess it helps if I tell you a bit about where it's on my background and in my role. I did a genetics degree and a PhD at Cardiff University and that was on human genetics and disease. And I worked in academia, so in Cardiff University for a number of years in research. That's absolutely what I love doing, and especially in human disease.

**Dr Amy Gerrish:** And I was working on identifying genes that cause certain diseases. Loved my job, but felt like I didn't really have a, it wasn't work that was going to have a direct impact to patients in the, immediately. So I moved into the NHS about [00:10:00] 10 years ago now moved to into Birmingham, into the women's and children's hospital in the genetics laboratory there and was looking at it's a diagnostic lab predominantly, but has some research within it.

**Dr Amy Gerrish:** And so one of the. About less by eight years ago now, one of the technologies that was coming on board then all people were starting to get excited about was something looking at something called cell free DNA, which as it sounds, it's DNA that's not in the cells of your body. It's just it's released from the cells and it's just in in the body fluids, such as blood plasma is one of the main ones that people look at.

**Dr Amy Gerrish:** And what this means, this, DNA comes from all cells. So normally if you look at a blood sample, you're just looking at the sample, the cells that are in. The DNA is in the cells of the blood, but this cell free DNA is basically from all cells across the body, ends up in the blood plasma. So this means that for example, if you've got a pregnant woman, the baby's DNA is in the woman, [00:11:00] the mother's blood plasma.

**Dr Amy Gerrish:** And also if you've got a patient that's got cancer. The DNA from the tumor is in their blood, so you can look for the tumor DNA in their blood. And this was really exciting because it meant that things like you didn't need to biopsy the tumor itself, you could just look at the blood DNA.

**Dr Amy Gerrish:** But at this point it was very early doors on it, on everything, nothing was in, in clinic at that point. And one of our colleagues, Heather and I colleagues Dr. Trevor Cole, he was the consultant geneticist for the retinoblastoma service at the time. This is about 2016. And he had the idea that we could use this technology in retinoblastoma.

**Dr Amy Gerrish:** And one of his main ideas was that this DNA, so tumor DNA from the retinoblastoma could be in a patient's eye fluid. So that we could analyze that DNA from just taking a sample of their eye fluid. So he got some funding to look into this. No one had ever looked at this before. There was nothing out, nothing published.

**Dr Amy Gerrish:** And then he asked, this is where I came on board, [00:12:00] was asked to look at this myself. And our pilot data, we showed that yes, you could see this tumor DNA in iFluid and you could analyze it and you could see the genetic changes that had happened in the tumor. And so that's where it started.

**Dr Amy Gerrish:** I'd say then since, so we got the sort of preliminary data, but it was a more complicated story than, as these things always are. And then we were hoping, so we needed more, But research funding to look at this. So that's where I then applied to fight for site through the small grant and the project grant and took over the running, of the research from Trevor.

**Dr Amy Gerrish:** So he retired in about 2022. He's still absolutely got an eye in on it. He still always wants to know cause it's one of his passions. And I guess he's transferred that passion to me now. So yeah. So since about 2017, I've been working on this basically.

**Katie Elliott:** Yeah, no, that's really interesting.

**Katie Elliott:** Yeah, no, that's really interesting. I've also got a question for Helen. Helen, how do we currently diagnose [00:13:00] retinoblastoma?

**Dr Helen Jenkinson:** Yeah, thanks. Thanks, Katie. So I think retinoblastoma is a little bit different from other childhood cancers in that the diagnosis is a clinical diagnosis. So we diagnose it on what it looks like its appearance on examination and not necessarily on a biopsy, getting a little piece of that tumor.

**Dr Helen Jenkinson:** And most children will be picked up by either a parent spotting a problem and that can sometimes be a whiteness behind the pupil or a whiteness on the pupil on a flash photograph where you would normally see two pupils are red, you would see one red, one white. And actually even these days, someone else spotting that the photograph is different because they've spotted it on Facebook or some other platform.

**Dr Helen Jenkinson:** So parents spot a problem. in the majority of children. And we have a small number of children who we are anticipating may develop retinoblastoma because of a family history. And those children are examined from birth. So they would [00:14:00] retinoblastoma probably on screening. So we'd be looking at that little one from birth.

**Dr Helen Jenkinson:** And then we would pick that up at some point in the first few months or possibly years of life. So it's a little bit different depending on whether we are anticipating a child developing metabastoma or not. But the pathway for all of these children is to usually be seen. by a local ophthalmologist.

**Dr Helen Jenkinson:** In Birmingham, we cover almost the whole of the UK from Birmingham upwards. So we cover we cover the Midlands and the North and Scotland and Wales and Ireland and the Republic of Ireland. So they, children will normally see an ophthalmologist locally first, and then they will be referred to one of the Two centers in the UK that specialize in Retinalblastoma, and that would be us in Birmingham with our big geographical patch, or the team in London who see almost the same number as we do, but a much smaller geographical patch.

**Dr Helen Jenkinson:** So yeah, so that's how the diagnosed and once they get to us children are diagnosed very [00:15:00] quickly. They have eyedrops put in, they have an anesthetic to look into their eyes. Photographs are taken of their eyes. And usually on the day we first. I think it's really important to see them and management decision is made about how we're going to go ahead and treat them.

**Katie Elliott:** Thank you so much, Helen. Amy. I've got another question for you, if that's okay. Could you tell us a bit about your small grant award with Fight for Sight and Childhood Eye Cancer Trust, and more recently Project Grant?

**Dr Amy Gerrish:** Yes, I can. What I might ask though, my own question is, Helen, could you just give a brief overview of how the genetics comes into a diagnosis of retinoblastoma, and first, and then I can go on to talk about our sort of work.

**Dr Helen Jenkinson:** Yeah, sure. So it's really important for us to know with as much certainty as possible, whether a child has what we call genetic retinoblastoma. Or non-genetic or some, you'll see it sometimes heritable or non heritable. [00:16:00] And that's because for children who carry a mutation of the RB one gene in all of their cells their eyes are at risk from birth and those eyes at risk up until later on in childhood.

**Dr Helen Jenkinson:** So it's really important when we see a new patient with Retinalblastoma to understand, is this a one-off problem? that we can deal with and hopefully the rest of their eyes are not at risk or actually is this a problem which we have to be very careful about because the retina in the remainder of their eyes is actually at risk of developing new tumors.

**Dr Helen Jenkinson:** So we need to understand the genetics of retinoblastoma and actually it makes a big difference and Amy's going to tell you how we would get to understand that but if you're a little one with genetic retinoblastoma and you carry a change in your Retinoblastoma gene in all of the cells in your body, then actually you will need to be examined very frequently under anaesthetic for the first few years of childhood.

**Dr Helen Jenkinson:** So for [00:17:00] children with genetic retinoblastoma, they'll be seen under anaesthetic usually till the age of three. And then they will be seen throughout childhood and they're not discharged until the age of 16. For a child who is non genetic, and we've treated their tumour, and actually the follow up is very different, most of those children don't need anaesthetics to check their eyes.

**Dr Helen Jenkinson:** They don't have to be seen all their childhood. They can often be discharged very much earlier. And actually, for those children, there isn't a risk to their offspring, so that we can be very reassuring to those children that they are not going to hand on any genetic problem to their children. Whereas those with a germline mutation, Not only are we thinking of that child's management, but we're also thinking of the future for them and their offspring.

**Dr Helen Jenkinson:** And it's really important that they understand that their offspring also need to have their eyes checked. So actually the genetics of retinoblastoma and whether they're germline or non-germline, [00:18:00] makes a huge difference to the pathway that they follow, not only for themselves, but for the rest of their lives and for their children's lives.

**Dr Helen Jenkinson:** Is that what you want me to say, Amy? Is that enough? Does that make sense?

**Dr Amy Gerrish:** So what, so just what's the word? Finishing off how it was diagnosed, genetics, while they decided how it was genetics, was to analyze the tumor DNA. You needed to analyze the retinoblastoma tunidae to find what had caused the retinoblastoma and then you could decide whether you would then know that it was just in the tumor, it wasn't in all the other cells of the body.

**Dr Amy Gerrish:** So you needed tumor DNA. And the only way that you can, you could do that with an eye or with retinoblastoma was if an eye was removed as part of treatment as yours was Katie and you would be able to access the DNA. Otherwise, the tumor DNA, otherwise it wasn't possible. Now previously that was the, one of the main treatments was to remove the eye.

**Dr Amy Gerrish:** So we got. the DNA quite frequently, quite regularly but [00:19:00] with amazing work that Helena now does with all the chemotherapy treatments we now have, it means a lot of patients are retaining their eyes. And which is fantastic for the patient, but as a geneticist, it means I'm, we're not getting that DNA to analyze.

**Dr Amy Gerrish:** So we just can't answer that question of what type of DNA genetic stigma they've got. And therefore they almost have to go on a higher risk screening program because we just can't rule it out. So this is where Trevor's idea came in, that we needed an alternative way to find DNA. And so we use we were looking in the eye fluid and as I

**Emma Blamont:** said India, sorry to interrupt.

**Emma Blamont:** No. Can

**Dr Amy Gerrish:** you just

**Emma Blamont:** explain for the listeners or the viewers what eye fluid actually is and how you might Get it. Yes. Yeah.

**Dr Amy Gerrish:** It's the eye fluid we're talking about, not to get too technical, it's called aqueous humor. It's at the front of the eye in front of the lens. I think I'm right in saying that Helen.

**Dr Amy Gerrish:** And what the reason that this was decided upon. Was because this gets taken out of an eye before a chemo, there's a [00:20:00] certain chemotherapy where they have to inject it directly into the eye. And so to keep the eye pressure, you remove a bit of eye fluid first and then you put the drugs into the eye. So this sample was already been taken and it was just getting thrown away.

**Dr Amy Gerrish:** And Trevor was like this, we should look at this. It's sure it's got this special DNA that we're looking at and that might have the tumor DNA in it. So that's where this, that's where it comes from. Yes. It's aqueous humor is the full term. And yes. So we found that with our first grant, I would say, which was from the Wellcome Trust, we found that, yes, there is tumor DNA in there.

**Dr Amy Gerrish:** But when you're looking at eyes that are being treated the levels of DNA is really variable. And it's a lot of the time we were not getting enough DNA to be able to do our genetic analysis. Probably something like only four out of 10. So 40 percent of the patients we're looking at had enough DNA which, is not really.

**Dr Amy Gerrish:** It's not good for patients, that's 10 we wouldn't be able to get a result from, and it's not great for great [00:21:00] putting into clinical service. So this, and what we'd found was that we could work out that it basically was how big the tumor was in the eye. If you had a big tumor, you got loads of DNA in the fluid.

**Dr Amy Gerrish:** If it's a small tumor. There was less. And obviously, as the tumor was getting treated with chemotherapy the tumor is getting smaller and therefore there's less DNA. So this is where our project grant, our first small grant, sorry, came in was we thought we've just got to start taking this eye fluid.

**Dr Amy Gerrish:** earlier in treatment. The treatments that we were, when we were collecting it, they'd had four to six cycles of chemotherapy by the time we got the eye fluid, just because of when that treatment is taken. But if we took it earlier, we were hoping there would be more tumour at that time, so more DNA.

**Dr Amy Gerrish:** And that's basically what we found with the Fife site amazingly gave us our small grant. We looked at it, we, I think we did 10 patients with a small grant and we could get a genetic result for 80%. So eight out of those two, eight out of 10 of those samples. which is just fantastic because that's a much nicer number of people who are going to get [00:22:00] a result.

**Dr Amy Gerrish:** So that's why we were at the small grant. And then with the fantastic, we were then, we need to, validate this more. Unfortunately, 10 samples is not enough to be able to take it into service. We then got our project grant, which is a much bigger two year grant. It funds more staff and the consumables, and we can really widen out what we're actually looking at.

**Dr Amy Gerrish:** So we've now done on this. This particular part of the grant, we've now done about 40 cases again, still seeing about 80% coming through with a genetic result. So that's just fantastic. And we, so we are going to hopefully be able to get this in, into service very soon. Sometime in the next two years, but what I what also we've now to do with the project grant is expand what we're even looking at, because this, we were just looking at what causes retinostoma.

**Dr Amy Gerrish:** Can we find out the exact changes that have caused retinostoma? And then we can tell whether they've got this genetic or heritable or non heritable version of retinostoma. There's some evidence coming out from America, that actually other genetic changes in the [00:23:00] tumor might make it more resistant to chemotherapy.

**Dr Amy Gerrish:** So if we can find that out at the same time, it gives information to people at home and be like this patient has this genetic change, which means they might not react, respond to this chemotherapy. And therefore they look at other treatment options. So that's something else we're doing as part of this grant, just to expand exactly what we're doing.

**Dr Amy Gerrish:** And you've just remind, you remind me, because you said you were treated at the Royal London, so this is a, we are Birmingham, we are one of the two centres, Birmingham and London, but also with Fight for Sight, we've been able to form a collaboration with London, so now we are getting national recruitment into this study, which, when you're looking at rare diseases, incredibly important, so I think, yeah, I'll stop there.

**Katie Elliott:** That's amazing. Yeah, no, that's really amazing. I didn't actually know that it was. Just Birmingham and the Royal London. So yeah, that's, thank you for that. So what [00:24:00] advances have you already been able to bring to patients?

**Dr Amy Gerrish:** Yeah so what I was saying then, so in terms of the Fife site work as I said, we've analysed 40 patients now under our under our research, and we've actually given that genetic information back to Helen and the rest of the clinical team.

**Dr Amy Gerrish:** So that is already becoming part of their sort of management. And that's probably been the last year I think we've been doing that. So that's already, I just still get an absolute thrill every time I get a genetic result, which I know is going to impact a patient and and their family.

**Dr Amy Gerrish:** So that is fantastic. What we've also been able to do through some funding from our Our BCH charity, so the Birmingham charity, is, remember I was talking about cell free DNA and how we've obviously looked at it in tumour DNA looking in eye fluid, and, but you can also look at it baby's DNA, mother's blood.

**Dr Amy Gerrish:** And as Helen was saying, there's a genetic or heritable version of retinoblastoma, where if there's a family history, the baby [00:25:00] is at risk potentially of inheriting retinoblastoma. And so what we've developed is a prenatal test. So while they're still in, the baby's still in the womb, we can take a sample of the mother's blood identify the baby's DNA within that blood and determine whether they have inherited the genetic change from their or whoever.

**Dr Amy Gerrish:** Whoever the mother, father and so we can get a diagnosis that yes, they are going to develop retinoblastoma prenatally. Which obviously for the family is much better to, because at the moment it's all done sort of postnatal testing. Because the only other option with prenatal testing was to do an invasive biopsy.

**Dr Amy Gerrish:** So basically what's called a CVS. So you take a sample of placenta and there's a slight chance of miscarriage with that. So Families don't really want to go down that route, they'd much rather wait for the prenatal, the postnatal, sorry, testing. But then, there's obviously the worry of the families throughout that, the period of pregnancy.

**Dr Amy Gerrish:** Then it's a challenge for us as [00:26:00] laboratories to get that result as quickly as possible once we've got the baby's blood sample. And just the management, it normally means that. Even if patient is negative because of the amount of time it takes to show that they're not, they haven't inherited it.

**Dr Amy Gerrish:** They've often already had to have a screening with Helen. So they've obviously already had been under anaesthetics. So if we can shove all of that prenatal analysis, then it just makes everything a lot easier. So that's something, so we've been doing that test that is in clinic that's in the NHS and is available nationally since about 2022, we call that in place.

**Emma Blamont:** Sorry, that's fascinating, Amy. Sorry, Katie. Can I just jump in and ask a question for Amy and Helen? I was wondering, what sort of age would you start actually treating then a young child or a toddler or a baby that's It's been diagnosed as having retinoblastoma prenatally, when would be the sort of intervention window?

**Dr Helen Jenkinson:** So we would still treat them as soon as [00:27:00] we saw a retinoblastoma. So knowing that they carry the genetic change tells us that they have a predisposition. And so it doesn't alter the pregnancy. We don't bring forward the delivery of the baby, but it allows us to know that little one is at risk. And so it allows us to screen from birth.

**Dr Helen Jenkinson:** And we would try and see children who we know are gene positive within the first week of life. So we screen all those children from birth on a very strict protocol, so we see them once a month under anaesthetic. And so it means that when they develop retinoblastoma, which is by far the majority, about 95 percent of children who carry the gene will develop retinoblastoma, we are able to step in and treat them straight away.

**Dr Helen Jenkinson:** And that means that we're treating them often at a very much earlier stage because we are looking for it. So it just allows us to put them into the screening program with that knowledge that we know they [00:28:00] carry the gene. And so we can just make sure that is done in a timely fashion. We do, however, have a number of children retinoblastoma.

**Dr Helen Jenkinson:** And so although some children might be gene positive and not present. For many months after birth, even, potentially slightly older than that. We do have a number of children who are already born with tumours. So we know that it's really important because if we see children at the very early stage with tumours, we treat them early.

**Dr Helen Jenkinson:** So it's, it's not unusual for me to be using chemotherapy in little ones who are only a few days old. So we can offer children the same thing. range of treatments, pretty much the same range of treatments, whether they're two weeks old or two years old.

**Emma Blamont:** Brilliant. I'll go back. Sorry, Katie.

**Emma Blamont:** I'll go back to you now. You haven't even finished, I imagine.

**Katie Elliott:** So thank you, Helen, for that. What do you think, Amy, would be the next step in [00:29:00] retinoblastoma research so that we can translate findings into the clinical benefit?

**Dr Amy Gerrish:** Yeah obviously we're already doing a little bit of that, which is fantastic.

**Dr Amy Gerrish:** I think the, one of the main things that we really need to do. So direct misdemeanor is a rare disease, obviously when it impacts the family, it impacts them, but generally we only see about 50 cases a year between the two centers. And we are obviously already in a collaboration with with those with the London.

**Dr Amy Gerrish:** So the real. Globally, what is now needed is international collaboration to be able to increase patient numbers that are on the same studies increase knowledge between centers of what analysis people are doing. And so we Helen and I are actually part of a European collaboration which is moving To yeah, to look at the eye fluid work, but also come into blood plasma, which I'll come on to in a minute.

**Dr Amy Gerrish:** And that is between six, including ourselves, six European centers [00:30:00] across Europe where we're looking to do pilot studies together and then potentially like for clinical trials. So I think that is, It's acknowledged that is necessary to be able to advance things quicker. As I say, I've been doing this since 2017, so it just takes a long time, mainly because of the sample numbers we're getting.

**Dr Amy Gerrish:** So yeah, so collaboration is key. Some of the other work, as I say, we're looking at so we're looking at these other vet in iFluid. Look at these other genetic changes as I've mentioned that we think might affect treatment response and so that's The sort of next stage I guess in iFluid work once we get the diagnosis into clinic And we're also looking at blood plasma In retinoblastoma and CSC, CSF, so cerebral spinal fluid, which is sometimes taken from certain patients, depending on their prognosis and that we're looking at that as a way of helping people like Helen [00:31:00] determine the treatment, what treatment is best for a patient by just giving them a bit more information about the genetics.

**Dr Amy Gerrish:** So yeah, so I think that's what is. There's, we've started the ball rolling now with what's possible, really. And so it's there's definitely still a lot to be done.

**Katie Elliott:** Yeah, no, definitely. Can I just ask, this is just a personal question of my own, how many types of treatments are there for retinoblastoma?

**Dr Helen Jenkinson:** Katie, that perhaps won't surprise you that things have changed a bit since 2007. Yeah. And when we were treating young people in 2007, we had fairly limited options.

**Dr Helen Jenkinson:** And it was about that time that we were starting to explore different ways of using chemotherapy. When you were diagnosed, the only way we use chemotherapy was actually into the veins intravenously. And chemotherapy is a kind of blanket word for anti cancer drugs, but actually they can be used in lots of different ways.

**Dr Helen Jenkinson:** So since [00:32:00] 2007, we've developed techniques to use chemotherapy directly to target the eye. So we can either use chemotherapy into the artery that supplies the eye. And it's a pretty technical procedure, which involves a child being asleep under anaesthetic and having a very fine catheter.

**Dr Helen Jenkinson:** Thank you. Placed into their circulation system and this catheter is fed up to the point where the ophthalmic artery where the blood supply goes to the eye forms and at that point the chemotherapy can be delivered which means that the eye actually gets a much bigger dose because it's directly into the ophthalmic artery supplying the eye, but the body gets a much smaller dose And so we're able to treat the eye more effectively with higher doses of chemotherapy, but not cause some of the side effects of chemotherapy.

**Dr Helen Jenkinson:** So we're able to do that. We're also able to, as Amy's already talked about, use what we call intravitreal chemotherapy. For a long time, the most challenging part of [00:33:00] treating retinoblastoma was intravenous chemotherapy. Was the fact that the tumours on the retina responded really well to chemotherapy because they had a blood supply.

**Dr Helen Jenkinson:** So the chemotherapy came in with the blood supply, treated the tumour. But quite often we were left with seeds in the centre in the jelly of the eye called the vitreous. And they were really hard to treat with intravenous chemotherapy because we just had to let the chemotherapy diffuse from the bloodstream into the jelly of the eye.

**Dr Helen Jenkinson:** There's no blood vessels there. So quite often we would treat a tumor, but not be able to control the seeds in the jelly of the eye. And so this procedure, which has led to Amy's work, and allowed us access to aqueous fluid, has actually also allowed us to give chemotherapy into the jelly of the eye.

**Dr Helen Jenkinson:** which is a much better way of treating seeds. So it means that we're now able to treat successfully many more eyes than we were at the point when you were treated. And so we have [00:34:00] a much lower rate of needing to remove eyes surgically. And actually we hope also that therefore we've got a higher rate of children who've got some sight, not necessarily normal sight, but some sight in their affected eye.

**Dr Helen Jenkinson:** So it's been a real story of change. I've been fortunate enough to have been with RET and Bastoma since we started our service in 2002. So One day I'm going to write a book about how it's changed because it really has been a success story of using chemotherapy innovatively and using research in such a way that it makes a difference.

**Katie Elliott:** Amazing. Thank you so much for that, Helen. All very interesting.

**Emma Blamont:** So I think we probably should start moving over now to Q& A questions from the audience, unless you've got, have you got more, any more questions, Katie, if you do, please. No, I don't.

**Katie Elliott:** I don't think

**Emma Blamont:** so. Okay. They were great [00:35:00] questions. I think we've had, they've opened up a really good discussion.

**Emma Blamont:** And I think, the work of Amy is, when you think about it, she said, they've already given results to like genetic information or potential genetic information to 40 children. And given the numbers are actually, diagnosed within the UK, I think this is, this is pretty impressive, so hopefully, this research is already having a brilliant impact or good impact positive benefit to lots of people out there that are affected by this condition. So opening up to the questions in the q and a got one for you, Katie. It's actually more of a comment than a question.

**Emma Blamont:** And it's about your pink sparkly eye that you're looking for. So somebody's put that the National Artificial Eye Service, I think that's what N A E S stands for, can make you a custom order for any eye colour you like, apparently. Oh, really? Yeah, so maybe look them up. Do a bit of a Google, National Artificial Eye Service.

**Emma Blamont:** Yeah, so your wish might

**Katie Elliott:** come true. [00:36:00] That's really interesting, I better ask my ocularist about that. Can I jump in there

**Dr Helen Jenkinson:** as well, Katie? I'm guessing from your accent that you might be based north of the border. So there is a little bit of a difference between the artificial eye services north and south of the border, but yes, the our anonymous attendees absolutely right that as well as providing NHS eyes, there is a custom service.

**Dr Helen Jenkinson:** And if you look at their website, they do have some really quite wacky eyes that. people have clearly chosen in the past. So I would encourage you to look at their website. They're fantastic and they will, I'm sure, help you with what you need.

**Katie Elliott:** Amazing. Thank you so much.

**Emma Blamont:** Okay. So the next question we've got that's been submitted is how does the new idea around testing relate to the current CVS and somebody's spelled her out as chorionic villus sampling test.

**Emma Blamont:** Which an expectant mum with a known history of RBE can [00:37:00] undergo.

**Dr Amy Gerrish:** Yeah, so I think what we do, so with a CVS You would have that taken, if I'm right around 14 weeks, I think, in pregnancy, you would have that test. As I say, it does have a very low chance of miscarriage, but it is there. They would they would get a result, obviously, and that, so that does give the prenatal advantage to the family and to the clinicians.

**Dr Amy Gerrish:** With our testing, with the blood testing we do for most we do this test type of testing for other disorders as well, such as cystic fibrosis and some muscular dystrophoresis. And we normally take samples about 12 weeks in gestation then. But because with retinoblastoma, we can go much longer into pregnancy.

**Dr Amy Gerrish:** So anytime in the second and third trimesters, basically we can take a blood sample and get an analysis back within I think it's a two week turnaround time, something like that. And then that obviously that information goes to the genetic, the [00:38:00] consultant geneticists. So these, Helen might want to comment on this, but these individuals, because they've got family history, they should already be within our genetic service.

**Dr Amy Gerrish:** And so we'll be already on the books as it were, so that they will know that we want to do testing on any future pregnancies before or before the baby's born, hopefully, or postnatally if necessary. Hopefully that answers the question.

**Emma Blamont:** Thank you, Amy. We've got another question, which might be perhaps more for Helen which was when was the JOE protocol, J O E, for systemic haemophils implemented?

**Dr Helen Jenkinson:** So the Joe protocol is the standard in intravenous chemotherapy that we use, and it was introduced in the UK in 1994. And and actually what's interesting about it, it was introduced by my colleague, Dr. Judith Kingston, who sadly passed away. A few years ago, but she was absolutely instrumental in introducing [00:39:00] systemic chemotherapy and conservative therapy to the UK.

**Dr Helen Jenkinson:** And actually we are still using the same protocol now. And so it's really hardly differed, although we don't offer intravenous chemotherapy to as many patients because we've got intra arterial, intravitreal. When we need it, which is often for children with bilateral disease, when we're treating both eyes, or when we've removed an eye, and we know that there are some features that we call higher risk, and we know that child will benefit from chemotherapy as well.

**Dr Helen Jenkinson:** It's really very similar to how it was back in 2007. So yeah, but 1994.

**Emma Blamont:** Okay. So things have changed some of the first treatments, first line of treatments are still being used then in certain cases.

**Dr Helen Jenkinson:** Yes, I mean it's still a highly effective treatment for retinoblastoma and our concerns about using the Joe chemotherapy or as much about the side effects of the [00:40:00] treatment and not the benefit from it because actually it works extremely well, but when you're treating a little one with intravenous chemotherapy, you do expose them to some longer term side effects.

**Dr Helen Jenkinson:** And we've got newer ways of monitoring those and we've got newer ways of giving some of the chemotherapy drugs to allow us to make a better judgment of how their body's handling it but actually, in terms of chemotherapy itself. It's still a very good treatment for retinoblastoma and it's used internationally.

**Emma Blamont:** Thank you. Thanks for clarifying that. And that ties into another question about how the benefits of chemo have changed. So it really explains that. Somebody has asked a historical question. They asked what would it be, I'm not sure whether this is maybe somebody who was affected, I've been diagnosed with retinoblastoma in the past, perhaps in the 80s.

**Emma Blamont:** But somebody's asked, what would have been the options for a patient and particularly in terms of chemotherapy within the [00:41:00] 80s?

**Dr Helen Jenkinson:** There wasn't a standard protocol in the 1980s. I'm pleased to say I wasn't working in the 1980s. So it's not quite my era, but there wasn't a standard protocol.

**Dr Helen Jenkinson:** And that was the, it was the early days of using chemotherapy as an adjunct to treatment for retinoblastoma. And some of the earliest chemotherapy was actually given by mouth. And so often it would be used alongside radiotherapy, sometimes black radiotherapy but it would be used by mouth.

**Dr Helen Jenkinson:** So agents that are still useful, so things like cytoplasmide, which I'm sure won't mean much to everybody here, but actually agents like that could be given by mouth. And that's where Dr. Kingston's work was amazing because she gradually. looked through the small clinical trials of our patients where she saw responses and worked again collaboratively with patients and clinicians around Europe to work out what was the best standard treatment but slowing, slow increase from the 1980s of oral chemotherapy, such as cyclophosphamide, [00:42:00] and then starting to use one, two, or three agents.

**Dr Helen Jenkinson:** And the Joe chemotherapy is three agents. So it's three different drugs that are used in combination.

**Emma Blamont:** That's helpful. Thank you. And I think, I don't know whether this is the same person as somebody else. Somebody has done for a very nice comment about Dr. Kingston saying that she was a wonderful woman. Somebody very appreciative there of her. Okay. In terms of other questions, I think there's one actually maybe for me here.

**Emma Blamont:** Somebody's asked, what are the Fight for Science small grants and project grants? So I'll try and explain that without making a hash of it. So we offer a range of grants for scientific research at Fight for Science. So our small grants are smaller pots of money. They're for 15, 000 for usually about a year's worth of work.

**Emma Blamont:** And it's really to help if somebody's got a good idea, and they want to de risk it by getting some preliminary data that shows that this idea works, and is worth pursuing further in a sort of larger grant. It's really to [00:43:00] help with that really for more sort of pilot studies.

**Emma Blamont:** And our project grants, the sort of larger grants, they normally run for two to three years, three years maximum, and they offer up to 250, 000 worth of funding, and that typically pays for a researcher, a postdoctoral researcher, or a research assistant who works on the grant, and does deliver some of the research, and also, all the consumables, the bits and pieces that you need to do the work.

**Emma Blamont:** Okay, let's just check. Are there any more questions in the chat? Somebody's put a comment saying that they find it amazing how much the testing for genetic risks and also the treatments have changed in the past 40 years. And they're very appreciative of the conversation and all the responses today.

**Emma Blamont:** So that's nice to hear. Are there any more questions? I think we've probably answered everything. Hold on, I can see [00:44:00] somebody typing, just check.

**Dr Helen Jenkinson:** Emma, if I can just jump in while this person's typing just to say, following on from that, that last comment about genetic risks is that Professor Cole, who Amy referred to, did a study and audit quite a few years ago now in the early days of our RB service in Birmingham, and actually demonstrated that people were making choices about whether to have children in the future based on information in their genetics, which probably wasn't as reliable or as accurate as it should be.

**Dr Helen Jenkinson:** And and actually some people were making the wrong choices. So chose not to have a family and based upon information that may not have been as reliable as it is now. So I think actually. One of the, additional impacts of the amazing work in genetics is that families have such a good and clear idea of what the risks are or aren't for their, future offspring, which allows so many more [00:45:00] families to make an informed decision.

**Dr Helen Jenkinson:** It's really important. And I'm now seeing families in it was, I'm calling a preconception clinic, but families are coming back, having thought about what's now available from a genetic understanding and wanting to understand more about if we went forward with a pregnancy, what would that little one be, exposed to what the treatments be like.

**Dr Helen Jenkinson:** So it's really opened up a dialogue in the retinoblastoma community, which has been so helpful and overcome those kinds of misconceptions from the past.

**Emma Blamont:** That's brilliant. So it's really having impact really across the board, which is helping people make informed choices. Before we wrap up, I just wanted to have one final question for Amy.

**Emma Blamont:** And it's really thinking about how, how soon, Amy, do you think we will start to see this being brought into services and seeing the benefit from this new, better way of diagnosis?

**Dr Amy Gerrish:** So for the iFLIRD work where we're looking at diagnosis saying whether someone's [00:46:00] heritable as I say, we are giving the results back to doctors or from the research, but that will be, we're applying now, there's something called the genomics test directory, which basically means that once it's on that test, the NHS pays for it.

**Dr Amy Gerrish:** We need no more research funding. We can say, thank you very much, fight for sight. We can take this from now. And we're looking to apply for that to come online. Yeah, hopefully next year would be the ideal. The other works are looking at the treatment response and some of the plasma work.

**Dr Amy Gerrish:** That's very much a work in progress that will be, the clinical trials we're looking at will be, 10 years time, something like that. But yes the actual diagnosis work should be soon. Brilliant. This

**Emma Blamont:** has been a really inspiring webinar. Actually, it's seeing something that's so close to actually, Patient benefit and, hopefully you're going to be delivering benefit to people in the near future.

**Emma Blamont:** So I think unfortunately that's all we have time for today in terms of questions. So this slide, which you will receive in your slide [00:47:00] deck, so you know, no need to write anything down, has some useful resources about retinoblastoma, Amy's work and more about the impact of fibrocytes work in general, and also, importantly, all about Katie and her story.

**Emma Blamont:** If you've enjoyed the webinar, we've got some more coming up in the webinar series. The next webinar is within our, was really showcasing work from our social change funding program. And it's called Building Confidence in Vision Impaired Children and Young People. And it's joined, we're joined by Henshaws, based in Greater Manchester.

**Emma Blamont:** And then in terms of our scientific research programme, the next research programme will be in May with Dr. Hannah Leves who's developing artificial corneas. And, some of you may be aware there's a shortage of corneas. For corneal transplants, and for every transplant that happens, there are about 70 people in need, 70 others in need.

**Emma Blamont:** [00:48:00] Be, please join us to hear more about how Dr. Levis work is, going to help ameliorate this situation. Okay. So thank you for joining us and thank you again to our speakers today. I've really enjoyed this webinar. And we hope to see you again. And please could answer the webinar survey questionnaire that you're going to be sent.

**Emma Blamont:** We'd be extremely grateful. Thank you all. And we look forward to seeing you next time.

**Emma Blamont:** Thank you

**Katie Elliott:** everyone. Thank you.