

## Numberphile Podcast Transcript

Episode: The Orchid Room and Cancer - with Hannah Fry

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Professor Hannah Fry discusses her cervical cancer diagnosis - and subsequent attempts to make sense of it all.

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[Gentle Music-box style intro]

Brady Haran [BH]: Today we're being joined once again by Professor Hannah Fry, a mathematician at University College London. Hannah's also an author, a broadcaster and a familiar guest here on Numberphile. Hannah's always great fun, quick with a joke, yet today we're talking about matters of life and death. That's because about a year and a half ago Hannah was diagnosed with cervical cancer. It was extremely serious, there were fears it was spreading. Within a month, Hannah had radical and life changing surgery, including a hysterectomy. It was a move which has hopefully saved her life. Hannah's a wife, a mother of two young girls, and experienced the fears and

emotions you'd expect from anyone facing cancer. But she's also a person supposedly well versed in the details of risk, of probability. She's rational, analytical. Did that change the way she thought about cancer? Well, Hannah filmed much of her experience and that deeply personal footage is gonna form part of a program about to be broadcast on the BBC. The show's called Making Sense of Cancer and today we're gonna hear more about it. But first, I asked Hannah about her diagnosis and how she spent many months setting aside a routine letter inviting her to be screened.

[gentle string music]

Hannah Fry [HF]: I did in fact have symptoms but I just dismissed them, because I'd just had a baby, like, you know, you're kind of all over the place, and yeah I was just really busy. So I had had symptoms but they weren't like these really strong, you know, I wasn't like doubled over in agony or anything. I just, they were mild enough that I just dismissed it. So yeah, yeah, I really came close to missing it.

BH: And then you had this letter telling you to come in and, you know, have a screening but you were like, I'm too busy and pushed it to the side?

HF: Yeah, which I think happens quite a lot actually. I mean I think [chuckles] I dunno, maybe it's just me, but I don't think that when women get a text message saying book your smear test, they're like, right, drop everything everybody. Emergency stations, time to get down to the nurses. It's sort of like a, okay, I'll pop it on the to-do list and I will make sure that it happens. And it was really one of those. It was one of those. I popped it on, it was in a little pile on my desk of to-do things, but with the pandemic and just lots of going on, it just it didn't reach the top of the pile for six months or so.

BH: On TV and in movies and that, someone being told they have cancer's like this huge moment.

HF: Mhm.

BH: Is that what it was like? Is it... or is it like a series of steps, oh it might be this, it might be this and it gradually becomes more and more serious, or is there this catastrophic moment where you're sat down in a room and someone says, I've got something terrible to tell you.

HF: It's sort of [chuckles] it's a little bit of both actually. So, it's a little bit of you know there's something up. So they detected some abnormal cells, and then they took a biopsy and the biopsy was like, okay there's abnormal cells but there's like a little hint that there might be something more serious. And then they went in again and took more and then, it's like it got more and more and more and more serious. But, when

they actually sit you down and say, this is your diagnosis, they have a special room that they take you to. And I had no idea about this before, so you go in and there are these sort of NHS white clean armchair in there, just two of them, facing each other, and like a little sad coffee table in the middle with a box of tissues that look like grease-proof paper. [chuckles] Right?

BH: [chuckles]

HF: And then the reason why I knew that it was like, oh, okay, I'm in the cancer room, is [chuckles] because on the wall there was like a three pound ninety-nine picture of an orchid from Ikea. [laughs] It's like... I sort of had this very strange out of body experience because obviously I knew the seriousness of situation but I was like, I was trying to imagine the moment that someone had that decision to be like, you know what's gonna make this go down better, a three ninety-nine orchid [chuckles] from Ikea. [laughs] Right? And it's like...

BH: What picture do you think they should've had on the wall?

HF: I mean maybe just an actual orchid would be nice.

BH: [laughs] Yeah.

HF: Right? Like [laughs] although let's be honest we know it wouldn't be watered. There was no windows in the room. So it'd probably dying and maybe you don't want a dying orchid on the table... [laughs]

BH: [laughs]

HF: ... when you're receiving that sort of news.

BH: When all this [sighs] this bad news is raining upon you and these huge decisions are to be made, at what point or did that kind of mathematical, analytical, Hannah brain cut in, or did that just all go out the window and you suddenly became just like, you know, an emotional person? What about my children? What about my husband? Am I gonna die? Or did that... did that mathy side of you cut in? Did the training take over?

HF: [laughs] Did the training take over. [sighs] Okay, so I think I discovered that this is certainly true for me anyway, but I think that there are almost two versions of yourself. I think that you have the sort of constructed version of yourself, the person who you think you are and the way you like to see yourself. The one that's been built from all the training that you've done. And for me it's the one that's like, you know, cut me in half and I'd bleed mathematics, right? That is absolute who I am to my very core. And then I think on the other side you have your sort of true self, your inner self. The one who sort

of gets tired and maybe is a bit lazy and just wants to sit on a sofa eating crisps all the time. And it was this real tension between those two over that entire period that it felt like my constructed self was just in... a tail spin. I had no idea where to turn. I had no idea where to look. I didn't... I couldn't work at that time and that's the thing that it needed... I needed for comfort. You know, and sort of my true self kind of took over and was very very scared and was very very... it just... I was like a rabbit in the headlights, basically, I just had no idea what to do or where to turn. I was completely terrified and I would repeatedly try and use statistics and try and use reading medical papers as a sort of comfort, as it were. But the more and more and more you read I just wanted to read something that said, this is what's gonna happen to you and you can't find it. It's not out there. So there's only so far that the mathematics and statistics will ever be able to take you in that moment. And I've spoken to a few other people, including David Spiegelhalter, who I'm sure won't mind me mentioning this. He's said it publicly before. But he's been in a similar situation where he has been diagnosed with cancer and you know all of the... the training as you call it, it only takes you so far really because at the end of the day you are just a really frightened person who doesn't know what to do next.

BH: When you're sitting down with the doctors and the experts who are talking through what's happening to you and what your options are, do you tell them? Hey look, I'm a mathematician, give it to me straight, give it... or give it to me different to how you would give it to some of your other patients. Do you like plead for them to talk to you in a different way?

HF: [sighs] So normally yes. Normally I'll drop in something nerdy. Something deliciously nerdy just to... a little like a secret handshake, you know, but the problem with this was that it was during Covid. And so I wasn't able to meet my team face to face until I actually went in for the operation. And I think that this was also, you know, January 2021 so the point at which the NHS was at its most stretched, the point at which the crisis was in its fullest force. And so I just very acutely felt like I didn't want to waste their time. I didn't want to, I don't know, take more than I was allotted, you know, take more than my allotted slot. And so I didn't push it, I didn't ask the questions. I didn't... it's much harder to do over the phone than it would be in person anyway, but I didn't do those signals of like, okay, talk maths to me.

[gentle piano music]

BH: I haven't seen your TV program yet but I have the read the very excellent interview with you in the Telegraph recently, which I will link to as well. It did come through, or I got the impression from that article that you do have some regret about how things

played out.

HF: Yeah. I think... I don't know if regret is quite the right word because I think regret implies that if I did it all over again I would've chosen a radically different path. And I don't think that that's necessarily true. But to give you just a bit more detail, so, the big thing about my case was that it looked as though the cancer had got into my lymph nodes. It was this big unknown, this big question. We couldn't tell for sure whether it had or not and the surgeons opted for as much risk reduction as possible. They decided to take out all of the lymph nodes that were in my pelvis and the result of that is that I now have this lifelong chronic condition called lymphedema where I have to wear pressure garments everyday, and I can't stand up for long periods of time. And it's something that can get progressively worse and some people end up being really seriously having their mobility seriously impacted by this condition. So [sighs] the thing that I wish had happened differently is that I wish that that calculation of risk, of the balance between my longterm chances of survival, the chances that the cancer was already in the lymph nodes already given the evidence that was there, and the consequence of living with lymphedema, I wish that I had been more involved in that conversation of that calculation, right? Because as it was I was sort of told what surgery to have. I could've said no, right? I could've been sort of quite forceful, you know I'm not suggesting for a second that the... that my surgeon did anything wrong... but as it was I was sort of presented with here is the surgery you're having and then I was left feeling as though I had paid a very very heavy price for risk reduction when in the end it turned out that actually all of my lymph nodes were clear. And I didn't need to lose them, as it turned out. As it turned out, because they took out so much [laughs]...

BH: Mhm?

HF: Because they took out so much I didn't need to have chemo. Right? So that was sort of like the extra win.

BH: Yeah.

HF: Which is removal of the parts of your body [laughs] instead.

BH: Yeah.

HF: The other option was... because it was cervical cancer, so they could've just removed the cervix and they said that if they did that... it might have meant that I could have had another child but the risk of miscarriage was really high, of complications in pregnancy was really high and also then I would be like really risking it with the cancer... cancer too. And I think that now having looked into loads since, I think that there are actually a number of different options between those two extremes,

of let's not take out very much at all and really risk it, and let's just minimize risk as much as possible and just take out everything everything everything and then some and then some and then some. And I think that it's just... I think that you want to as a cancer patient to be able to look back and feel as though you had agency but true agency. Real agency rather than between two sort of false choices. You know? It wasn't a binary choice and it felt like it was, and I think that I may well have gone for that, you know, for the same radical surgery anyway, but I think that if you're really really giving informed consent then it means being really really informed and for me that meant fully understanding both the benefits of the treatment in terms of just how much of a difference it would make to my risk but also really the costs of it.

BH: For people who don't know, you do have children, two girls as I understand. You and your husband were open to the idea of having another one and that was something... that was obviously something you had to weigh up, 'cause that... that would cease to be an option as I understand it.

HF: Yeah, I really wanted a third, I really wanted a third but yeah I think that's just one of the things that you have to come to terms with.

BH: You talk about those sort of risk and, you know, weighing up all these things but I guess when the stakes are death.

HF: Hmm!

BH: And... and things like children and family, you know, two of the most important things in the universe to us as humans.

HF: Mhm, mhm.

BH: It must be really like hard to how to apportion weighting to these things. Like it's not just, it's not like betting on a horse or looking at traffic flow, like sort of suddenly the stakes are so different, like, I imagine normal kind of risk-reward assessments must be... it must just be really hard to apportion weighting to these things?

HF: Yeah, it's true and I think that the only person who can possibly do it is the patient themselves, I don't think that you can create an equation. A sort of population level analysis of this that applies to everybody. I think the only person who can really weigh up their own values is the patient themselves. And I think that really that's the... that was the sort of view that I was left with after this experience was that we have all of these risk calculations but they're based on things like the number of people who survive to ten years, or... um... you know, the number of people for whom the cancer doesn't return. And then they don't include things like, I don't know, just the heavy

heavy cost of treatment. I mean, in terms of your paying with your organs, right?  
[laughs]

BH: Mhm.

HF: I mean cost in the most sort of visceral sense. But there's also I think that there are times where the numbers exist, the numbers are there that you can look at but it's how you interpret them that is different for different people. I think that was the impression that I ended up with over the course of this experience was that the formulae that we have at the moment for who should and shouldn't have treatment and how to reduce risk and what risks are worth taking and what prices are worth paying. I just don't think that they are designed to take the individual patient's values into account enough. And I really noticed this when I [clears throat] I went on to make these film and spent a lot of time in cancer clinics and talking to cancer patients and there was one day which I think I will never ever forget. So I was in this cancer clinic and there was a woman who had just been diagnosed with breast cancer and she'd had a lumpectomy, she'd had a chunk of it taken out, and they were discussing whether or not she should go on to have chemotherapy. And for her, because she was in her late sixties, her chances of living another ten years, if she did nothing, right? If she literally stopped treatment right there, that was it, her chance of living another ten years were eighty-four percent. But, if they took everything that medicine had a throw it at her, all the hormonal treatments, chemo, everything, they could increase it to eighty-eight percent. So, chemotherapy and I mean... chemotherapy is not fun, right? But... it could increase her chances by just this four percent. And that number might mean something completely different to you than it would to me. It might mean something completely different to somebody who has a young family versus somebody who is, you know, in a later years and actually just wants to enjoy the time that they have left, right? It kind of means different things. And so I think that that calculation [sighs] it's not enough to just put it in terms of numbers, you also have to take into account people's values. But the reason why that day will stick in my mind forever is because I was there in the room when the doctor was explaining this to the patient and then I went outside and I had a chat with her and I said, that's a tough one, right? Like that's really hard, you know, to go through all of that for such a small number that's tough, right? And her response, she said, oh well I have to have chemotherapy because otherwise I'll die. And I was like... that's.... that's not... that's not... that's not what was said. That's not the situation.

BH: Hmm.

HF: I mean obviously I didn't push it, you know, she's in crisis, right? So I went back into the doctor and I said, she didn't understand what you were telling her. And the doctor was like, yeah, I mean, [clucks] you know, you're much more uncomfortable

about this than I am because I know, I'm the one who has to sit here and see those four percent, I have to see those people who could have stopped their cancer coming back and then they have to come and see me again and I have to try and treat them but I know it's incurable at that stage. And I was like, I mean, okay, sure, like I appreciate that, you've got this population view of the statistics and I'm talking about the individual view. But just, I really don't feel comfortable about the fact she doesn't understand what she's letting herself in for and the doctor replied, if they understood they wouldn't go through with it. And I just found that the most incredible statement...

BH: Hmm.

HF: Because... I'm definitely not saying that people should't have treatment here by the way, right? I had treatment, I had all the treatment. I know it saved my life. I'm definitely not saying that. But I really do feel uncomfortable about the idea that we're sort of making decisions on behalf of people and not really taking the time to understand what it is that's important to them and what they want to preserve about their lives going forward. Whether it's time or quality of time.

[gentle music box music]

BH: Did you come away from this process and the film making process with a suggestion or an idea. Like if you were put in charge of the National Health Service tomorrow, is there an answer, is there something you would do? Is there something you would change on day one to deal with this problem?

HF: [chuckles] Yeah, but I don't... I... yes. [laughs] Yes. [chuckles] So I think in that room with the orchid, when you get diagnosed you get a nurse who sits with you and you can ask her anything you'd like and you can... there's no pressure on time, you have much time as you want.

BH: Mhm.

HF: And that's a really helpful thing because it just gives you the breathing room to think things through properly and I think when it comes to making treatment decisions actually it's almost the opposite. You have fifteen minutes with your surgeon, at the beginning they say this is what we think, the risks are this, this, this, this, this, this, this, and this. Everything's sort of given the same equal weighting, do you want it, sign here, off you go. And I think what I would like to see is that you have that consultation with the consultant and then you go off to another room but in that room somebody sits down and just says, what is important to you?



BH: Hm.

HF: What are your values? What do you want to preserve above all else and how do we work out what you should do going forward based on your life and what matters to you?

BH: I'll tell you what, as someone who's currently going through the National Health Service to have a baby with my wife, everything you're saying about your cancer path applies to that as well. The number of times I've sat in a room and I've had a bunch of stats and numbers thrown at me and then been told to make an instant decision or have the decision made for you, it is exactly the same situation

HF: And yeah, I really noticed that, you know, when I was having my babies I think that actually women and like parents have gotten quite good at understanding that in that situation you have to stand up for yourself, right, you have to sort of...

BH: Mhm.

HF: You have to kind of fight for yourself, right? I mean I'm sure you've been told this a thousand times, like, when you're during labor, if someone isn't right you need to make yourself heard, you need to sort of, you know, be your own advocate...

BH: Yeah.

HF: ...for your own health. And actually in cancer care, especially at the beginning with diagnosis, there's... you sort of need that as well, right? You need like that... I don't know, confidence to be able to say, no, just stop, I need to think about this. But you are so frightened and so grateful [chuckles] for people who are going to save your life that there's just none of that.

BH: Yeah.

HF: That none of that is there at all.

BH: I guess I think maybe around birth and having children there is this new infrastructure that's popped up. All the baby groups...

HF: Mhm.

BH: ...and the things you get involved with.

HF: Mhm!

BH: And there's so much talk and chatter in those groups about how to play the system.

This is gonna happen, but this is how you counter it, you've got to stand up for yourself and you got to do this, and maybe that has sprung up around cancer the same way it has around having babies.

HF: I think if you're in cancer care for quite a long time, you know, I think for people who have long term treatments, you know, are in chemotherapy more than once, I think actually they become quite good at speaking up for themselves and demanding second opinions and pushing for certain treatments and certain scans and things. I think it's just that, you know, you're thrown into this world and time is really of the essence. I mean there are support groups out there, don't get me wrong, like Macmillan for example, oh my goodness, Macmillan are incredible. They're absolutely amazing. And I don't think anyone's necessarily doing anything wrong here, but you know, you are ultimately talking about [chuckles] talking about something that's quite close to my heart, right, which is an interpretation of numbers. And... I don't think there's quite the support there for that as there is for other aspects.

BH: But also like... again... attaching numbers to things. It's easy to attach numbers on how many years you might live after this, what the percentage chances of this in terms of whether people are alive or dying or have the cancer cells or don't have the cancer cells. But how do you attach a number to how easily you walk? How... you know, those other things that you're having to attach values to? How important it is for you to have a third child or not.

HF: Mhm. Mhm.

BH: And like, and you can't. There's no number to attach to that really, 'cause it's fuzzy.

HF: No of course, which is why the individual is the only one who can ever make that calculation. I think though one thing I would say is that actually those numbers about, you know, your chances of survival or the number of years you live or whatever, these are not... [sighs] the number that you pick as your metric ends up making quite a big difference as to how things look. So for example with that story that I told you about the story of Ann who had breast cancer and between eighty-four percent and eighty-eight percent. I was in a pub with David Spiegelhalter and I was chatting to him about exactly this and he said that at the moment the metric they use is your chance of living another ten years. Cutting it that way it looks like you're better having the chemo. But he thinks that the evidence that's being collected at the moment that if instead you say your chances of being alive at fifteen years, actually, chemotherapy damages your long term survival, that you would've been worse off by having the chemotherapy. You know, that the chemotherapy at that stage in life is such a severe process to go through that you just never really recover from it. And so I think it's just, you know, it's party

that you can't make this... it's really hard to make this balance between concrete numbers and emotions, which is what we're talking about here, but I think it's also adding in the fact that actually these aren't concrete numbers anyway. These are numbers that are totally dependent on the type of metric you're choosing.

[gentle piano music]

BH: A thing you did during your process, which is perhaps not common, is you did document it. You filmed lots of the steps, which is the reason you've been able to create this film about it, that we're all gonna see soon hopefully. Why were you filming it?

HF: So [sighs] really early on when I first got the diagnosis I had no way which... I had no idea which way it was gonna go, right? Like and there were definitely points where it looked very very very serious. And so I think I started writing a diary just because I wanted a record of how I was feeling and what was going on. But I also found it quite therapeutic just to articulate my emotions. It's like that basically my constructed self. It was giving my constructed self something to do, right? [chuckles]

BH: Hm.

HF: And then I started filming too because if you're documenting it, you know, one way, you may as well document it the other. And it wasn't until a bit later, a few weeks later, and I was talking to my friend who owns a TV company and he persuaded me to take the filming a bit more seriously when I went into hospital and so on. Because he said that the difference about this footage to other footage, or the difference about this film that I ended up making compared to it at another film about cancer is that this wasn't just somebody who had cancer, this is somebody who's spent their entire life thinking about numbers and about risk and about probabilities and about how to weigh those up and how to combine them with being human and it was that person having cancer and that perspective is something that isn't necessarily... well I haven't necessarily seen it covered that much elsewhere. So that's really where the film came from, but I think that once I was out the other side I realized all these things that I've been talking to you about are just a story that's much bigger than my own. And so I think in the end when you watch the film there is some of my story in it, you know, but the way I see it anyway is that that my story is the thing that gives me permission to talk about these much wider issues about how we view cancer and how we view of it and our fear of it changes the way that we deal with it and how bad we are at [chuckles] combining numbers and emotions when it comes to something like this.

BH: Was there ever part of you that thought you might not be watching the film at the end? We might be watching your film and you wouldn't be here?

HF: Oh yeah.

BH: Yeah?

HF: Totally. Like right... I mean that was sort of one of the reasons why I started filming it because I was like, well, if it doesn't work out for me then I kind of want my daughters to have, you know, not sort... it wouldn't be fun footage to sit down and watch on your eighteenth birthday, do you know what I mean? [laughs] But like... to sort of know... to feel like they were a part of it, or had some thing, some sort of documented way to look at it.

BH: What's it like for your watching it now? Watching that footage that you recorded?

HF: Umm... [pauses] there's one bit that's still quite tough to watch. You'll know it when you see it. [laughs]

BH: [laughs] Okay. Good teaser.

HF: [laughs] Good teaser, right, exactly.

BH: We'll watch it for that.

HF: I mean I've thought about nothing else but cancer for a year, is making this documentary, and I actually that process of being able to intellectualize this and really think through everything, it has completely brought me back to life and so actually I don't... I mostly don't find the footage difficult to watch, because I think that actually it's been a really really therapeutic process making it for me. I think they should offer that on the NHS, right, for everybody to be able to work through the emotions of their treatment is everyone should get a film crew [laughs] to follow them 'round for a year.

BH: What do you hope is going to be accomplished as a result of this film being put out?

HF: I think all I would like is for people when they are going through cancer, to feel a little bit more empowered to ask more questions and to put themselves first, rather than just taking the first thing that's offered to them. And I think I would also like it to be a little bit of a reminder maybe that, you know, I think if you're a doctor who works in this, in oncology, I mean they're amazing by the way, right? Like they're really sympathetic and they're... I mean some of them have been absolutely extraordinary. But I also think that actually it's your nine to five, right? Like you're sat there and everyday you see patient, patient and patient and patient and patient and patient. And I think it's quite hard to remember the asymmetry of that encounter, that for you it's just your nine to five but for them it's the moment when their whole world

has just completely fallen apart. So I think it's those two things really together is that, is just a reminder of what it feels like to be a cancer patient, but also for cancer patients themselves to just feel a little bit more empowered.

[15 seconds of silence]

BH: Because you've put it out there so much, you know, you've made the decision to talk about it and try and get these messages out there, obviously everyone now knows all these intimate details about...

HF: [laughs] it's true.

BH: ...your cancer and your treatment and stuff like that. What's it like for you now when you go to meetings and you're meeting people and that sort of stuff, what's that like? Has that created a weirdness or an awkwardness? Is that hard for you? Is it easy for you?

HF: The clearest example that I can give you possible of why I think these conversations are important. So a few years ago they did a study on prostate cancer where they had a thousand men who had been diagnosed with early stage prostate cancer. Now the thing is is that if you've got cancer in your body, right, I'm sure your instinct would be the same as mine was. Get rid of it! Cut it out! I don't want it in my body, get rid of it. So in this trial a group of people went off to have surgery, a group of people instead did nothing. It was just let's watch and wait, let's keep an eye on it, see how it progresses. And after ten years there was no difference in survival between those two groups, whatsoever. Doing the surgery at that stage made, you know, it didn't save anybody's life. And yet for all of those hundreds and hundreds of men who'd had that surgery, they were essentially left with non-functioning penises, right? They had erectile dysfunction, they had urinary incontinence and they also had bowel issues. Really high probabilities of all of those things. This is stuff that you know these surgeries it's not like, hey [sighs] sorry about your cancer scare, you know, it's like no no no no, my life is profoundly changed as a result of this, of what happened, and I think that it's so important to have these conversations outwardly and openly, yeah I think the detail is part of it.

BH: I can imagine there will be people who won't thank you for pointing that out there. It sounds like a little like, anti-vaxxer doesn't it? It sounds like...

HF: What to be anti-treatment?

BH: Yeah, to be like, you know, don't have a treatment, it just ends up damaging you

and doesn't save your life anyway.

HF: Oh, right.

BH: And I know that's not what you're saying but...

HF: No it's definitely definitely not what I'm saying. It's definitely not what I'm saying, I'm not saying these treatments are bad things. I think I'm saying that actually we're so scared of cancer. You know it's this terrible shadow, right, like some people say, you know, the big C because you can't even say, it's like Voldemort, right, you can't actually even say the word. We're so terrified of this disease that our instincts sometimes are to do something that actually runs counter to our best interests. I think that's what I'm saying. It's that the urge is to just be rid of this stuff as quickly as you possibly can, and yet, I think what I'm trying to say is that sometimes you should just slightly fight that urge. There's one more thing, can I just, I'm sorry, 'cause it's just a staty thing. There's a study in Denmark in the 1970s and there was a group of pathologists who wanted to try and work out how many people were wandering 'round with cancer that they didn't know about. So what they did is they had seventy-seven women, so these women had died very recently from things like heart-attacks or car crashes, all kinds of different causes and they were all a big range of ages as well. And with the permission of their families, these pathologists they performed double mastectomies on these women and they searched through all of their breast tissue to try and find any abnormalities. So none of these women had been diagnosed with cancer while they were alive, right? And, I don't know, like, what do you think? How many of them had cancer? Maybe one? Like? Maybe two in seventy-seven? Actually... about a quarter of these women had abnormalities that would have counted as either cancerous or pre-cancerous diagnosis had it been discovered while they were alive. So they've repeated these studies, right, for thyroid cancer, for prostate cancer and for breast cancer again and the best estimates, so I mean the numbers are a bit lower, quite a bit lower actually. But the best estimates are that between about two and seven percent of us at any time are wandering 'round with cancer in our body that we have no idea about. And that doesn't mean that we've got this really scary thing. This epidemic that all these people are gonna die, right? It doesn't mean that at all. Actually it means the opposite, that in fact, quite often cancer will sit in your body and not trouble you for your entire life, right? There are sometimes that cancers are so slow growing that you will be dead from something else way way way before it will end up causing you trouble and if you are going in there and cutting out every single one of these slow growing cancers, you know, in the neck if in the case of thyroid, you know, in the prostate, or you know, or in the breast, actually [sighs] you're not saving anybody's lives and [sighs] sometimes it's just better to fight that urge.

[gentle piano music]

HF: There's a survey where they asked cancer patients if they would have a chemotherapy that was unlikely to prolong their life and what the threshold would be that they would consider having it. And for people who had cancer or for members of the public the numbers were... the most common answer was, oh I would have chemo even if it gave me naught point one percent chance of prolonging my life. And then they asked oncologists, then they asked the people who actually are the ones giving out these treatments and for them the most common answer was I wouldn't have it unless there was over a fifty percent chance of it working. And I do think that's pretty extraordinary actually. That there's such a gap [sighs] what kind of gap have we created where the people who are offering these treatments wouldn't want it for themselves?

BH: What's your current status now? What like where are things at for you now after you've had your surgery and everything. You're all clear and things are good and what is the future hold?

HF: Yeah. I'm all clear. Things are good. There is a one in ten chance that it will come back although that was a single number that they gave me and I suspect that it decays over time. I haven't got the curve. [laughs] But [laughs] but things are all good. I am... it's not something that bothers me. It's not something I wake up in the middle of the night thinking about. And, actually I have been, I really really count myself among the lucky ones. Not only in terms of the fact that... that my treatment went well and I don't have to live with this disease but also because I think that I've had the opportunity to have the gift [gentle piano music fades in] of it as someone said. I think it's just given me this amazing... [music fades up] this perspective on what's important and how life is.... [music continues] something to be enjoyed.

[piano music fades up and down]

BH: Hannah's film, Making Sense of Cancer, will be broadcast on BBC Two, here in the UK on June the second. Check your local guides. It will of course also be available on the BBC I-player for streaming. [music continues] I'll include useful links and information in the podcast description about the TV show, about cancer, and more about what Hannah's up to. [music continues] Numberphile is supported by the Mathematical Sciences Research Institute. I'm Brady Haran, thank you very much for listening today, and we'll be back with another episode very soon.

[music slowly fades out]