**Centre for Personalised Medicine podcast**

**Season 3 Episode 3**

***Sustainability (environmental)***

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(Our podcast logo features a section of the artwork [‘A Lifetime of Measures’ by Aneesa, aged 12, from Oxford High School](https://cpm.ox.ac.uk/centre-for-personalised-medicine-art-competition-2022-23/), the stunning winning entry to our 2022-23 Youth Art Competition).

**SPEAKERS**

Rachel Horton, Gabrielle Samuel, Sarah Briggs, Louisa Chenciner

Hi, I'm Rachel Horton. I'm a Junior Research Fellow at the Centre for Personalised Medicine, or CPM. In this series of the CPM podcast, we're looking at the themes we've identified in our new strategy. And today's topic that we'll be talking about is sustainability in personalised medicine, with a particular focus on environmental sustainability. Joining me to discuss it, I've got several of us from the CPM team.

**Sarah Briggs**

Hi, I'm Sarah Briggs. I'm a junior research fellow at the Centre for Personalised Medicine and an oncology registrar working in the NHS. My research interests are in environmental sustainability in healthcare.

**Louisa Chenciner**

Hi, my name’s Louisa Chenciner. I'm a research fellow at the Centre for Personalised Medicine, a public health doctor and an NIHR academic clinical fellow with an interest and commitment to the intersections between climate and health. I’m also an honorary research fellow at the London School of Hygiene and Tropical Medicine, where my research is based.

**Rachel Horton**

And we're also so pleased to be joined by Dr Gabrielle Samuel from King's College London. Gabby, please could you tell us a little bit about your work in this area?

**Gabrielle Samuel**

A lot of my research in this area explores the intersection between environmental sustainability and data intensive health research, which often encompasses approaches that I suppose are umbrella-d under the banner of personalised medicine. So I've looked at, for example, biobanking and genomics and digital health apps. In particular, I focus on the ethical and social issues associated with bringing the environmental agenda into the moral gaze of those who consider the ethical issues associated with personalised medicine.

One thing I would like to say really early on in this podcast is that I have increasingly moved away from using the term ‘sustainability’, because I find it quite problematic because of the way it comes to be defined and mobilised in practice.

**Rachel Horton**

Tell me more about the term sustainability not feeling right to you.

**Gabrielle Samuel**

I think it starts with initially, what does it mean to be sustainable? So I think it's a North Star for many people, as in something to kind of almost move towards. But when it comes to implementing that in practice, often it's really, really difficult, right? Especially if you're kind of drawing on a tri-pillar approach of environmental, economic and social sustainability, trying to balance all of those three things is, if you have a look at the literature, and particularly if you're thinking about businesses or healthcare, is a really, really tricky task. And while there are often co-benefits, there are also decisions that might need to be made that kind of factor in one but maybe leave the other one on the wayside.

So in terms of what you're actually doing in practice, I think it's better to say, you know, I'm mitigating the environmental harms associated with *this* particular practice. That might make something *slightly* more sustainable, but overarchingly, when we think about environmental sustainability, are we talking about that specific practice, the institution, the society, or globally? To get to the point that I want to talk about, which is, ‘How are we thinking about the ethical issues?’, you almost if you use the term sustainability, have to define and explore each aspect before you get to the point where you can talk about what you want to talk about.

**Louisa Chenciner**

I think for me, the term sustainability, the concern is when it's sort of bandied around without really thinking about what it means, and particularly sometimes it's used synonymously with thinking just about carbon alone when we think about environmental sustainability, and that in itself can also be very problematic. You know, we know that to be environmentally sustainable is not just to achieve Net Zero. There's a lot more that's encompassed in environmental sustainability.

So for example, thinking about biodiversity, environmental degradation, waste products, particularly when we talk about healthcare systems and also other precious resources. So I agree, I think when we talk about sustainability, and specifically environmental sustainability, we need to be really clear from the outset about what we mean, and also recognising that it's not just narrow scope, narrow remit, and it doesn't just relate to carbon and carbon counting.

**Sarah Briggs**

Yeah, I was just going to say I think another challenge with the term sustainability is how loaded it is. In a sort of broader societal context for people? So Gabby and I have been have recently done some work, qualitative research in members of the public and people generally associate sort of sustainability and being sustainable as something that's morally good and that they ought to be striving to achieve.

But that then brings with it lots of conflicts with other life values and lots of emotions associated with that, when people fail to achieve those aims. People when we were speaking to them, often spoke about feeling guilty for not making sustainable decisions, or not prioritising that when there were other sort of competing interests in their lives, which can be really difficult when you're trying to motivate people and trying to find a way to talk about it that takes out, or at least minimises, some of that emotional conflict and sort of guilt, I think is quite important.

**Gabrielle Samuel**

I just wanted to pick up the point about carbon-centric approaches, which I think is a really important point, and it's something I think Sarah and I have spoken about quite a lot as well. Some scholars have called it, I think ‘carbon tunnel vision’, where you're only focusing on carbon. And I've been thinking about this quite a lot using the term ‘environmentality’ or ‘green governmentality’, which is how we come to govern the environment in practice, and thinking about what that means and how we're doing this in terms of healthcare or health research.

And a lot of the work around governmentality looks at how governance over the past half century, century, more, has been about collecting data. Collecting data to make governance decisions about how we should do things. And I think that's what we're seeing emerging in terms of sustainability, in terms of these carbon-centric approaches, because we have carbon accounting models. So now all of our efforts come into “how do we conduct carbon accounting so that we can add it to a spreadsheet?” and then investing money into doing more carbon accounting to make it even more reliable, even though that carbon that we're putting on the spreadsheet is a social construction of the carbon out there, and then, you know, investing into modes or tools of governance and professional societies that can then teach us how to do carbon accounting and so forth. Whereas all the time, what gets hidden, as you were saying, all the other effects or environmental issues that kind of get lost in that process, because they potentially aren't being counted or are difficult to count.

I think digital technologies offer quite a nice example of where reducing carbon gets prioritised potentially at the expense of other environmental issues, because this drive for efficiency, which is often conflated with improvements in economic and environmental sustainability in inverted commas, has meant that you will often replace your digital hardware much more quickly than you might otherwise, because as they become more efficient, you can run more energy intensive algorithms, but you need better software, and therefore your hardware becomes obsolete. So you buy newer and newer hardware, so you're constantly replacing and in fact, data centres do constantly replace their digital hardware, which means what you're doing is amassing electronic waste at very high level, which in itself, is a massive social and environmental justice issue globally.

**Sarah Briggs**

I think one of the challenges has been the sort of focus on green inhalers and the drive to move to lower carbon versions of inhalers. So the background to that is that there are different forms of inhalers that are used for things like asthma and COPD, and the gas driven propellants that are used in a lot of inhalers are very potent greenhouse gasses, so just using those emits a lot of carbon or carbon equivalent gasses that cause global warming. And there are alternatives available called dry powder inhalers that don't emit these gasses and are much more carbon saving.

A lot of the early drive in sustainable healthcare, one of the sort of flagship drives really, was around trying to promote prescriptions of the dry powder inhalers, and encouraging discussions with patients. So sort of not forcing it on patients, but encouraging discussion with patients, where appropriate, about switching their inhaler use. And in the UK, we use a lot more of the gas propellant inhalers than a lot of other European countries.

Actually, the ultimate thing that you need is for people's disease to be well controlled. And if that is well controlled with a gas propellant inhaler, then that's a positive thing, regardless of the environmental impacts, because overall, if you've got better controlled asthma, you'll be using fewer inhalers, and so your total environmental footprint will be lower.

So the focus on switching inhalers certainly early on in these discussions, probably slightly detracted from the overall, slightly more nuanced narrative that needed to be taking place around better asthma control overall, although more recent guidelines, and there have been some really excellent guidelines around inhaler switching, very much explore those wider issues in a really nice way.

**Rachel Horton**

Interesting just thinking about the inhaler example, and I guess we’re often balancing these harms against things which are good, but not in the same domain. If somebody's health is better, from an asthma perspective, that's a good thing, but it's not necessarily an environmentally relevant good thing, though I guess it could be if they use fewer inhalers and have fewer hospital admissions and all of that. But how do people kind of balance things where there might be some harm to the environment, but you are doing a good thing in another way?

**Gabrielle Samuel**

Sarah and I did some focus groups with members of the UK public about how they think about environmental harms and of the NHS, or the UK NHS, and I think it was, I would say, a complete consensus that health comes first. So in healthcare, the most important thing is that human health is dealt with. That's why patients go to doctors, and that's got to be the priority for both patients and clinicians. So if you're talking about kind of that, that balancing between human health or patient health and environmental issues, I think in the context of healthcare, human health always has to come first.

And so the question *then* becomes, “where can you insert environmental considerations in a way that does not affect human health?” One of the things that kind of emerged from our findings is, because of the inadequacies of care that we have in our health system in the UK, particularly at the moment, it's nearly impossible to kind of think about these environmental considerations when patients are too busy trying to even get access to care, and the type of care they so require, or I would say, our participants spoke about the idea of co-benefits. So, reducing hospital admissions because you've looked after yourself, or taking responsibility for your own health care.

Although that raises its own questions about can you take responsibility for your own health? Or, *should* you take responsibility for your own health? And is that the same for everybody, or are different cultures, contexts, personal circumstances going to make that much more context dependent and how can you think about those issues as well? So I'm sure Sarah has got way more to say about this as well, because obviously we did the focus groups together. So I’ll hand it over to Sarah.

**Sarah Briggs**

I think actually, when we're thinking back Rachel to your question about how we balance these things together, talking to people who are impacted by it. So talking to members of the public is quite important about how things should be prioritised. But also, that also needs to be informed by broader thoughts about national policy and meeting, you know, commitments for sustainability. The challenge here is all the commitments are around carbon reaching net zero. So that is a whole bag of worms in itself.

But anyway, places like NICE, who have historically thought about, you know, clinical benefit versus financial costs are starting to do work around looking at how you might incorporate sustainability, environmental metrics, into decision making around technology approvals and drugs-based approvals, but it's a lot of that work is really in quite early stages still.

So they did a consultation with members of the public around how they might think about health care and health care's environmental footprint, and broadly got quite similar findings to those that we found in our focus groups, in that actually the members of the public they spoke to supported thinking about environmental sustainability, but they very much felt that that should not be prioritised, particularly where there were areas of unmet need or no existing treatments.

But they were generally willing for the environment to be thought about, where you were, for example, comparing *new* available technologies or treatments with existing technologies, and thinking about the environmental footprint of different options. But the challenge of how you weigh those, the financial and the social and the environmental costs and benefits of those, I think, is really an area that a lot of people are thinking about now but don't have great answers for.

**Louisa Chenciner**

It's important that, you know environmentally sensitive health care doesn't have to mean bad health care? You can have good care that is also more environmentally sensitive. There are synergies between these two ideas, and also to pick up on, in the UK, some of the Royal Colleges, like the Royal College of Physicians, have published material. So the Royal College of Physicians has published a green physician toolkit that sort of brings together some of the evidence on health and climate change, but also suggests some actions that physicians can take, you know, in their day to day practice.

And when I was listening to Sarah talk, I was also thinking just in terms of our discussion I suppose, we're talking quite a lot about health systems and their environmental effects. But obviously it's *really* important to consider the health effects of the changing climate, when we think about how we talk to people, more broadly about climate, particularly in a healthcare setting, that's not just talking about the environmental effects of healthcare, but also about the effects of a changing climate on people, particularly with longer term conditions, also pregnant people, young children, I mean, much of the general population.

**Rachel Horton**

Are the sort of, well, the impact of, I guess, particularly personalised medicine, but healthcare in general, on the environment,t and the environment on health well appreciated? It sounds like you've had some really interesting focus group discussions where people reflect on it. But I wondered whether the starting information that healthcare has an environmental impact, and the environment impacts on our health, was that something that everyone was like, “Yeah, we knew that”. I guess this question partly comes from the first time I did a podcast with Gabby on this topic. I was really surprised by the environmental impact of personalised medicine, and I'd not connected them in that way before.

**Gabrielle Samuel**

Yeah I remember when we did our first podcast, and it was all related to the digital aspect of personalised medicine, because obviously personalised medicine is much broader than the digital aspect. And so I suppose for those that aren't aware, digital technologies or the digital sector, accounts for roughly 2 to 3%, *very* approximately, of global emissions, and that's related to, particularly data processing is likely to have increased due to energy intensive AI, particularly around generative AI, but also has other environmental impacts associated with mining and manufacture and the disposal of digital technologies.

I, for one, was very surprised when we did our focus groups, because it seemed that there was at least one or two people in every one of our groups that had come across these environmental impacts before that are associated with digital technologies. There is definitely an increasing moral gaze on big tech and the environmental footprint of particularly Gen AI, for any number of reasons why that gaze has been very much focused on them.

But I think that there's other environmental impacts that we need to not forget about, relating to personalised medicine, because there's also wet lab research, and so therefore you have things like single use plastics, toxic reagents that are used, they need to be bought, they need to be disposed of. How can we ensure that they're shared as much as possible and so forth?

And then also the development of the drugs themselves. And then, if we're thinking about personalised medicine, changing manufacturer approaches from drugs for all, so generic approaches to mass manufacture, to much more individualised manufacturing of drugs, and how the environmental impacts of those are changed?

And I think this is, this is all a new area, like we don't know the answers to these questions in terms of drugs. We don't know the answer to the questions in terms of personalised medicine and the relationship with digital technologies.

Ultra low temperature freezers are another example that are often used in personalised medicine, particularly biobanking. Because I've done a lot of work around biobanking. They’re a massive energy hungry aspects of health research. There's a culture to keep these freezers at minus 80 degrees, even though evidence suggests that by raising them to minus 70 degrees, it doesn't affect sample quality at all. We’ve actually traced this culture back to kind of this marketing, this marketing drive to try and sell more freezers. So as soon as there was this technical feasibility to have minus 80 freezers, because we used to have minus 70s, when I did my PhD in genetics, they were all minus 70s. So they're now called minus 80s. They're not even called ultralow temperature freezers. So there's this real culture not to increase the temperature, even though it can have huge amounts of savings in terms of energy, both financial, right, and environmental and just increasing the temperatures.

**Sarah Briggs**

In terms of what the public sort of are aware of, I think they are aware of the environmental impacts of lots of individual things, like quite a few people were aware of the environmental impact things like data centres, and very aware that data is increasingly, as you know, the currency of healthcare.

Waste always comes up in all conversations about the environment as really a top priority for people. And when we spoke to members of the public around healthcare's environmental impact, the waste that they see both in terms of physical waste, but also, you know, waste of people's time, wasted appointments, really came up very frequently.

Before being part of the focus groups, almost nobody who took part had thought about healthcare's environmental footprint. And you can imagine, people who come to a focus group on the environmental impact of healthcare, most of them were quite engaged in thinking about the environment generally in their day to day lives, but hardly anybody had thought about the impact that their own healthcare had.

But actually, people are really keen to talk about it, and they're really keen to be part of the discussions about how that challenge is addressed. Which I thought was really interesting. And they're really interesting to think through practical issues, but also the moral complexities of how we make decisions about that. And issues around social justice and inequality came up fairly frequently in the focus groups.

**Louisa Chenciner**

You're talking about inequality, and I was thinking about economic inequalities, and part of me feels the slight elephant in the room in this conversation is also talking about capitalist structures that also reinforce some of the practices which are harmful to environment, and also perpetuate inequalities, so not just from a social and economic perspective, but also in terms of who experiences the most harms from climate change, despite often emitting the least.

**Rachel Horton**

Please can you tell me a bit more about that, how the impact is sort of most felt by the people who aren’t necessarily responsible for the environmental harm?

**Gabrielle Samuel**

So I’ve read many authors who would argue that climate change isn't actually an environmental problem, but it's a social, political one, very much because it's those in the lower echelons of society that are going to be, and actually already are in many countries, most affected. And I think that when climate events hit, the reason that those who are poorest in society get affected is because of the sociopolitical reasons or decisions or factors that have meant that infrastructure was not placed or was never placed in these areas to begin with. And so I suppose, while I actually do see climate change as an environmental issue, not least because it's harming the planet and other non human animals and plants, I do tend to agree with these authors that you can't separate environmental issues from equity issues.

And this is, of course, I suppose, the premise of environmental justice. Which calls for justice regarding the burdens of environmental harm. So it is very much a social justice movement about environmental harms. And I think we now see emerging narratives around just transitions, which are attempting to do just that for climate change.

But I think the notion of justice is a really inadequate term to explore these issues, because justice is really temporarily flat, which means it doesn't do the conceptual work that's needed to exploring why these injustices are emerging in the first place or in the beginning. And it's really important that we kind of explore the structural issues that have led to the injustices and the structural forces that create the injustices, if we have any chance of addressing them. And then, of course, we need to do that specifically with a lens on personalised medicine.

**Louisa Chenciner**

So I'd agree. I think when we talk about climate justice, we need to appreciate that minoritised ethnic and racial groups on a global level and local level, are among those who are more likely to be affected by climate change despite having contributed the least to greenhouse gas emissions and environmental degradation. And when we think about these disparities, we need to acknowledge and counteract the fact that they are rooted in historic and current systemic discrimination and socioeconomic marginalisation of these groups, and that also serves to exacerbate underlying health inequities.

And when we talk about personalised medicine, there are also these same issues and the same need to adopt an antiracist approach. In particular, for example, we see underrepresentation quite consistently in many of the trials and publications that inform implementation and practice of personalised medicine, especially among minoritised ethnic and racial groups. So we need to acknowledge these systemic discriminatory powers that are at play, both in terms of climate but also in relation to personalised medicine.

**Rachel Horton**

Are there ways in which personalised medicine can be actively better for the environment?

**Sarah Briggs**

I think it definitely can, in that, the whole premise of personalized medicine is about getting the right medicine to the right person at the right time. The whole idea of that is to avoid giving people unnecessary treatments that might cause unwarranted side effects in a way that they're not going to benefit from, which obviously is tied up with a huge environmental impact, because you're wasting medicines. You're giving people problems that they didn't have in the first place, and you're not treating the problem that you were trying to treat. So the premise of personalised medicine has huge potential to improve both healthcare for people, but also to reduce its environmental impact.

And it goes back to that fact that personalised medicine will, of itself, have an environmental impact. And what are the pros and cons on both sides of those coins, and how do we do it in a way that is equitable? And applies to society as a whole, not just in the UK, but internationally?

**Gabrielle Samuel**

I don't think the answer depends on how you define personalised medicine, but I think it's important that you think about when you talk about personalised medicine, what type of personalised medicine and how you're defining it.

So I know how it's defined, I suppose, in the clinical realm. But I suppose many sociologists have queried what personalised medicine actually means in the sense that have we not always tried to deliver personalised medicine, and isn't what's new, the fact that we're relying more and more on data to kind of get that personalisation, and how do we get around not losing that holistic approach?

Well I agree with what Sarah says. The premise is that it will be environmentally more sustainable, but if we see personalised medicine as just collecting more and more data, thinking that the data is going to lead to better health outcomes, which we know it does not, it can help, but only if used in the right way or appropriate way. Then, then we're missing something. So that's just worth bearing in mind.

**Louisa Chenciner**

I was just going to add, I think it depends on how personalised medicine is conceived, and as you've both said, how it's implemented, and that can look different in different contexts, and part of that depends on what physicians and health systems expect of personalised medicine, but part of it also depends on what patients and their loved ones and the general public expect of personalised medicine, and we're starting to understand that more and more as we see it actually be implemented in practice.

**Gabrielle Samuel**

It reminds me of some work that our colleague Susie is leading on, where we looked at how members of the public thought about this idea of what personalised medicine is. What it came down to was actually just better care, better communication. Their ideas about personalised medicine was not about these innovative new technologies. To be personalised, meant to be considered, to be listened to. And this has been talked about so many times, right by sociologists and healthcare workers. And that's low tech, right?

But this move to, if we can be more caring as a healthcare institution that might address a lot of issues rather than kind of jumping straight to higher tech solutions. And a number of our focus group participants did talk about, you know, if they just give me time, and actually listen to me, it might have been a better approach than just prescribing me something.

**Sarah Briggs**

The structures that healthcare is embedded in drive a lot of these issues. It’s a real challenge, and one that isn't something that… it's hard for individual healthcare systems to deal with that, but something I've been thinking about quite a lot. So I'm an oncologist, and the sort of market forces that drive drug production and pharmaceutical development, they actually provide a lot of really perverse incentives, which then become completely embedded in the way we deliver care.

So thinking about things like drug scheduling, you know, it's in a pharmaceutical company's interest to have more frequent administration of medicines, because you get paid for, you know, each dose that you're… you have to buy all of those doses, and things like immunotherapies now, we've got increasing evidence that actually less frequent drug administration can be just as effective, but a lot of trials are based on more frequent administration, because that has historically just been how these drugs have been given.

And obviously, from a market perspective, you're losing your sort of financial gain by deintensifying these treatments. It really highlights the fact that we need all aspects of healthcare, all of the pieces, to be working on this. And you know, a lot of pharmaceutical companies are doing good things in, you know, tackling their environmental footprints. But the whole structures that society work in, you could argue, need to be challenged in in really having the impact that we need to be having at this point.

**Gabrielle Samuel**

Every single conversation that I have, when I discuss my research, ends up with what to do, and it just goes higher up the structure, the hierarchical structure, until you end up with “it's our entire structural model of capitalism and consumerism and marketing that has led us to these issues. I thought we got away from it, but we didn't.

**Sarah Briggs**

I think it's important to hold on to the fact that actually, there's a lot that we can and have to do within those structures. We are where we are, and in some ways, while we need to have those discussions about what the implications of that are, and how we might, in the longer term, change them, we have to do a huge amount now in the very short term to mitigate our environmental impacts and I guess, you know, we have to do that within the structures that we're living in at the moment.

**Gabrielle Samuel**

But I think we're moving in the right direction in terms of bringing in regulations, right? Regulations around this. And I think, I think we are doing that now, and it's just about, kind of progressing along that pathway of bringing these environmental considerations in. But I suppose that's why we're having these discussions now, because there are so many open or unanswered questions about how we do that in the best way.

Because I suppose that the UK, we were almost, kind of leading the way in terms of considering the environment in a health system. And so if we can get it right as much as possible here, then we have a legacy for other countries to learn as much as they want, or not, from what we've done to help them build their own best practices around these approaches as well.

**Rachel Horton**

Thank you so much for joining me for a really interesting discussion. We've got lots going on at the CPM that touches on the sustainability theme. One thing I'm especially excited about at the moment is we've recently announced the winning entries from our youth art competition, which this year focused on how personalised medicine affects our planet. So please do have a look at the CPM website, where you can see the amazing art pupils in years 7 to 9 sent in on this topic, along with lots of other content exploring sustainability and other big issues in personalised medicine. Thank you very much for listening to this episode of the CPM podcast.