Unknown Speaker 0:06
Welcome to this podcast series on evidence in women's health brought to you by the Centre for Evidence-Based Medicine and the Postgraduate Programme in Evidence-Based Health Care. My name is Dr. Anne Marie Boylan, and I'm a Senior Researcher and Lecturer in the programme, and together with Associate Professor Jamie Hartman-Boyce and Professor Carl Heneghan, we will be interviewing relevant experts, discussing the strengths and limitations of different sources of evidence as they relate to women's health and considering their implications for future research.

Unknown Speaker 0:35
Hi, I'm Jamie Hartmann-Boyce. I'm Director of the Evidence-Based Health Care DPhil Programme and an Associate Professor at the Department of Primary Care Health Sciences at Oxford.

Unknown Speaker 0:44
Hi, I'm Carl Heneghan, I am Director of the Centre For Evidence-Based Medicine, an urgent care GP and in the University of Oxford I'm Professor of Evidence-Based Medicine and that's a lot of titles with evidence in it.

Unknown Speaker 0:55
In this our first podcast we're returning to January 2022, when a Canadian study hit the headlines here in the UK. It claimed that women were 32% more likely to die if operated on by a male surgeon. Needless to say headlines like these are worrying, particularly for the women it seems they affect. The study in question was conducted by Christopher Wallace and colleagues who sought to examine the link between surgeon patient sex discordance and postoperative outcomes. It was a population based retrospective cohort study using existing data of elective or emergency procedures in Ontario from 2007 to 2019. The exposures were surgeon patient sex concordance or discordance, and the main outcomes and measures were adverse postoperative outcome defined as death, readmission, or complication within 30 days after surgery. Secondary outcomes looked at each of these individually. Data for over 1.3 million patients and nearly 3000 surgeons were included in this study. It found that 14.9% of patients had one or more adverse postoperative outcome. But that worse outcomes were seen for female patients operated on by male surgeons, but not for males operated on by female surgeons. So what does this all mean for women? Are we really at a 32% increased risk when we undergo surgery? And do these findings from Canada have any relevance to the UK? I met with Jamie and Carl to discuss what all this means. My first question is, what is a population based retrospective cohort study?

Unknown Speaker 2:29
Well, it's interesting, I've been involved in a population based study, I actually did my DPhil in the Oxford vascular study. And population based means it was done in a defined population. And this was done in actually nine general practices across Oxford and Oxfordshire, a population of about 90,000. So you can have a denominator, and then from that, you can calculate things like the risk of stroke or the number of strokes with the numerator. And that's helpful in a population based study. But it generally is observational, you're just observing what happened. And one interesting thing you said about this is it's retrospective. So you're looking back in time, which introduces all sorts of biases compared to prospective when you start and go forward in time.

Unknown Speaker 3:14
So why does that introduce bias?

Unknown Speaker 3:16
Well, just think about it. It's something simple, like for instance, we're going to ask you about your smoking status. And I go back in time, and I go, well did you smoke five years ago? Well, you might forget, you might look in the databases and say, let's look if it was recorded, and there are problems, and you might be missing data. So with a prospective study, you start out by saying, let's record your smoking status. And probably the most famous one of them is Richard Doll's study about British doctors and smoking. And then you say, let's record it, and go forward in time and they went forward in 50 years, well imagine 50 years in time saying, Did you smoke 50 years ago, let's look in your medical records to see if it was recorded. So there are huge problems with missing data and the way people report information when you ask them about the past compared to now and going forward in time. And Jamie's work is all about smoking, so you know well about the smoking doctor study don't you, Jamie.

Unknown Speaker 4:08
I do indeed. And it's one of those things where let's say you had lung cancer, and then you are asked if you smoked 5

0 years ago, you might be more likely to remember that indeed, you did smoke 50 years ago. So that's where bias ca n creep in too. It's not just that you're missing data, but that some people are more likely to report having smoked, fo r example, because of suffering something that they perceive to be smoking related.

Unknown Speaker 4:29
Plus as well, simple things like with the doctor's study, they were actually able to ascertain the exact number of cigar ettes smoked on a yearly basis. And so what they could do is create a dose response relationship. The more you smo ke, the more likely you were to have lung cancer. And they could quantify that quite clearly because he did it prospe ctively. You can't do this and going back in time because of the problems of the missing data and the reporting probl ems.

Unknown Speaker 4:53
Does the sheer number of people included in this study, get over these factors in any way?

Unknown Speaker 4:58
So there's a really interesting issue, which I often talk about is this concept of accuracy versus precision. And it's a bi t like throwing darts on a dartboard. And what we mean by precision is, they basically are the darts are very close to gether. But they may not be accurate. So they're not near the bullseye, whereas accurate information is around the bu llseye, but they're not close together. And so these huge big data studies provide lots of precision around the estimate , but you often have to worry about, is it accurate information about the truth. And you should always have that level of critical thinking and sort of scepticism when you see the size of the study. And importantly, the bigger the study, the less verification, or particularly the exposures and the outcomes that's occurred. And that introduces bias.

Unknown Speaker 5:45
This is about breadth over depth perhaps. So they collected particular things, but not necessarily a lot of intricate inf ormation?

Unknown Speaker 5:54
I would say they haven't even collected anything have they? That's the problem with big data these days is you just g o to the database and you start fishing and having experiments. It doesn't mean it's not important because often what I consider these our hypothesis driving, we think there's some exposure, we think there's some outcome, and here's a signal, but often what's happening in the modern world, the way they're being reported, they're being reported as tho ugh they're causative, and we found the truth. And there may be many factors underlying this issue that might explai n why this is occurring in this dataset.

Unknown Speaker 6:27
Emily McFadden is a senior statistical epidemiologist who leads a module on big data epidemiology on the Masters i n evidence based healthcare. She told us about confounding factors that could affect this to these conclusions.

Unknown Speaker 6:40
So if the distribution of these additional factors or confounding factors differs between the groups that you're compar ing, then that might distort the association that you observed between the exposure and the outcome. And so the effe cts can either mask an association or create one where it might not truly exist. There are a number of techniques that observational studies use to try to minimize confounding, and it might happen at the design stage. So how the study i s put together, or it might happen later in how the data was analyzed. And this study used a statistical method called adjustment to try and minimize the effects of these possible other confounding factors. It's important to remember th at this data wasn't collected for research. This data was comprised of a number of linked datasets and each of these w as collected for different purposes. So some of the databases were collected for clinical treatments. But they also use demographic records and professional information from the surgeons as well as an insurance database. While they w ere able to adjust for the potential confounding factors, they were only able to do so using the data that was collected . And it's likely that there was some residual confounding by both known and unknown factors that wasn't accounted for. So one of the factors that seems particularly relevant was the complexity of the surgery and the author's gauge t his by using procedure type. And so if we look at the raw data, we can see that there are differences in the types of s urgery that the male and female surgeons performed: the male surgeons seem to perform a higher proportion of neur osurgery and orthopedic surgery, female surgeons performed more general surgery and plastic surgery. And it seems

likely that there may be some differences here. That's important. And so while the authors acknowledge that they've adjusted for this measure of complexity, it's possible that the male surgeons were performing more complex and hig h risk surgery. And it seems a pretty big limitation of the study that that's the only way they could measure complexi ty. But it seems something that seems worth exploring further if the data can be found elsewhere.

Unknown Speaker 8:39
You know, it's very hard to argue with Emily's explanation, it's a really good explanation isn't it? But like much of st atistics and epidemiology, lots of words in there, that you have to translate down: residual; ssociation; confounding. And I guess this is the problem with the way the language is construed that you have to start to put your own meanin g on some of these terms.

Unknown Speaker 9:01
So Jamie, in a really kind of lay friendly way? What does confounding factors mean?

Unknown Speaker 9:06
Yeah, so let's give an example from smoking, because we've already started out with smoking as it were. So even tha t wonderful British doctors study, there was a lot of, especially tobacco industry, commentary that, oh, that it's just a n observational study, it's not actually that smoking causes cancer, it's not actually that smoking causes heart disease, it's that it's something about people who smoke that make them more likely to both smoke and to suffer a heart attac k. And if that was the case, that would mean there was a confounder. So yes, people who smoked were more likely t o have heart attacks, but it's not because of the smoking. It's because something else that links those two, and in that case, the argument was stress, stressed out, people smoke and stressed out people have heart attacks. It's not the fault of the cigarettes. It's the underlying stress. And what Emily's talking about here, and indeed, what the author's talked about in the paper is that there could be some things that link your chance of a bad outcome after surgery and the lik elihood that as a Woman you'd be operated on by a man, that doesn't necessarily mean that being operated on by a m an is what is causing your increased risk of those worse outcomes. And complexity is one of the things that they talk about. And it's interesting. Emily says, well, it would be great if they could go back and measure that better in the da taset. But as far as I understand it, actually measuring the complexity of a surgery is an art rather than a science, poss ibly. So there's lots of things that go into it about the patient's underlying state of health, about whatever procedure h as to be done, and the intricacies of that procedure that would actually be incredibly hard to measure as it were. So g etting to the bottom of what's happening in the study, even if you had great data on complexity might still actually be really tricky.

Unknown Speaker 10:40
So when you're doing a research study that has lots of these confounding factors in it, what do you do as a researcher to try and mitigate against them?

Unknown Speaker 10:47
Best example I always think about is areas like vitamins and supplements, because in observational studies, they alw ays look like they give rise to incredible health benefits, they reduce your risk of heart attack and risk of stroke. But i n those studies, what happens is the people who tend to take vitamins and supplements tend to live healthier lifestyle s, they weigh less, they exercise more, and they do all the things that actually would lead to a reduction in a heart att ack. So what you try and do is start to look at some of those factors and try and adjust for them. So for instance, you may look at socio economic status. People that are wealthier have healthier lifestyle and take supplements, so you ca n either match them to groups, or you can try and adjust for them in your analysis. Now what Emily was saying thou gh, even though you do that, you still end up with this concept of residual confounding, there may be something else you just haven't collected the information for, and you can't adjust for. That's why ultimately, to test these interventi ons, we use randomization, which tried to balance out the confounders in two equal groups, and therefore the only di fference should be the exposure or the intervention. However, in certain situations, it's not possible to randomize peo ple, for instance, you can't randomize people to smoking because it's unethical because they can't randomize them so mething that's harmful. So there are situations where the only evidence you're gonna get is observational study. And that's why you should do it in a really robust way, with a prospective study, going forward in time, and collecting the measures that you want to account for as you go forward. I'm gonna go back to a chap called Doug Altman who was a famous statistician, unfortunately died, but he wrote a paper which going back 25 years ago, an editorial in the B MJ, which said, we need less research, but better research. And at the moment, we've got hundreds of 1000s of obser

vational studies published each year, we're overwhelmed with information, and they keep coming. And actually they're having no impact on practice. They're just leading to confusion in the population.

Unknown Speaker 12:46
Emily was also concerned about the media's focus on the secondary outcome of death.

Unknown Speaker 12:50
The headlines seem to focus on a secondary outcome of death rather than the primary outcome, which was the combined adverse postoperative effect. And they've also focused on the secondary exposure, which is where they broke down the primary outcome of patient search and sex discordance into more detailed gender categories. And it wasn't the key headline result of the paper. And if that had been picked up on by the press, it may not have been quite so impressive.

Unknown Speaker 13:17
The main results from this study is what they call a composite outcome, which means they're combining lots of different bad things that can happen to you after a surgery all into one outcome. And what the authors do is they report that as their primary outcome, they're very clear that that's what they set out to look at. But the most startling result has to do with death in particular, and it has to do with One Direction of discordance. So women operated on by men, and that is what unsurprisingly, has been picked up on in the headlines. It certainly is something to be very aware of whenever you read a paper and whenever I read a paper I'm thinking about: is this what the authors actually set out to test is that the headline result we're getting are we getting the thing that looked the most impressive of the authors are reporting 100 results, but only one of them is interesting and that's the one that the media is picking up on then I think that should give us a little bit of pause for thought. That doesn't mean it's not worth exploring further. So I think that's critical. It doesn't mean it's not worth the conversation. But as Carl said earlier, I suppose one of the things to think about studies like this is that they're there to generate hypotheses, they're not there to prove anything. And I think if we were saying that this study proves something, then it would be particularly problematic to focus on a secondary outcome that wasn't the main thing they set out to look at.

Unknown Speaker 14:28
So is the finding that women are 32% more likely to die if operated on by a male surgeon true?

Unknown Speaker 14:34
It's an accurate representation of the data, it is splicing the data quite a bit. And also, there are many different ways you could express the numbers and 32% more likely is probably the most alarming way you could make those numbers look and that's the issue of relative versus absolute risk. Fortunately, death was relatively rare in this population, and so even 32 percent more likely is actually when it comes to me if I was a woman being operated on by a male surgeon, if I looked at the absolute data, I'd be a lot less alarmed than I would be if I saw something that said I was 32% more likely to die. So it's not inaccurate. But I'd say it's been selected as the headline that the most people will read.

Unknown Speaker 15:17
Can someone explain to us what absolute and relative risk means?

Unknown Speaker 15:21
You're sort of you're jumping into this world of the media and trying to get you to read the article. And this concept of absolute and relative is at the core of evidence based medicine and reporting, but it's something that the media does all the time. One of the best examples for instance, you can understand this with a contraceptive pill and your risk of deep vein thrombosis. And when this gets reported taking the contraceptive pill doubles your risk of getting a deep vein thrombosis. And when that was first reported, it led to a pill scare, and people stopped taking the pill. But actually, always, when you hear that, figure it out the 30%, it's a double, it's double of what and your background risk, if you're a healthy woman, or pregnancy bearing age is about 15 per 100,000. So you double that to about 30 per 100,000. So the absolute increasing risk is 15 per 100,000, who take the pill. So it's still an important risk. But that feels much less than double your risk. The interesting issue, if you stop taking the pill and get pregnant, you actually quadruple your risk. And it goes to about 70 to 8500 pounds. And and that's important information. So if you put them together, they give you a balanced view of the decision you may take. The problem is the 15 100,000 to 30 won't get you

to click on the headline. So these relative measures will persist. You just need to be a bit more critical when you think about it's 30% or it's double of what?

Unknown Speaker 16:41
Sunil Patel is a Canadian surgeon doing his DPhil in evidence based healthcare. Here he talks about the confounding factors and contextual information that he thinks are important when thinking about Wallace's study.

Unknown Speaker 16:54
I certainly think there's confounding based on a lack of details regarding that care. One thing I did think that was interesting was there really wasn't a lot of different scenes in emergency surgery. And it seems to really be seen in elective or planned surgery, where I think there's a lot of interaction leads up to someone coming into elective surgery from the discussion with the surgeon, the agreeing to go forward or not with the surgery involving other healthcare professionals. I think one of the things that the authors specifically state is that they did not assess other physicians or healthcare workers that were involved in the care. For instance, the anesthesiologist of the day could have been a female or male, we don't know, we have a number of large academic centers that perform a large proportion of these surgeries. And we have a significant number of female male trainees involved in their care that may or may not have been doing most or all of the procedure. So there is some details there that I think are not explored, because they're not available and likely are providing some confounding to the study results.

Unknown Speaker 17:48
I guess what's important when you listen and why we have to do this work is because people will come in and women may come in and be particularly concerned about 'I'm about to be treated by a male'. Well, actually, what it's looking like is that it's the old problem of it's apples and pears that it depends on the type of surgery you're having. where your risk factors already, all the care around, it will impact on your outcomes. And this single isolated factor is one issue. But it's only one small issue in the whole pipeline that might affect your care and outcomes.

Unknown Speaker 18:20
Yeah, one of the things Sunil said, which was interesting as well about the pathways that you'd often have your preop assessment, you'd meet with your surgeon beforehand, and they might even decide whether or not you go forward with the surgery. And you can imagine all of those different things might be feeding into it as well, that we just don't see here. And I think that's why it was interesting that I made that point about it not showing up in the emergency surgery. But I think one of the things that struck me when I was reflecting on this study is yes, we don't know what is driving this. But when we talk about the most likely causes of potential confounding, it's that male surgeons were more likely to operate on the more complex patients. And that doesn't mean there's not a big inequality playing into this, it just might be a slightly different inequality, about the makeup of the medical workforce, which also bears some attention. So I don't think we can dismiss this on the basis of confounding but really think about all the different ways in which inequalities are playing out in the healthcare system.

Unknown Speaker 19:13
I mean, I qualified in 2000. So that's 22 years ago, and in that 22 years the makeup of the workforce has changed drastically in that time. So if you look at those that are coming through now, at the end of the career and they're experienced and probably taking on these, probably more males than females in that position, will that be the case in the next 10 or 20 years? No, because we've got a much more flatter, equal in terms of female males coming into the profession. You still may see these quirks in certain specialities where surgery with a certain way of thinking or the lifestyle is not particularly facilitative to certain family life and so forth that you might see these imbalances but I think it is radically different now to what it was when I first entered 20 years ago, and I think that's a really good thing and that might explain some of what's happening here, which I hope will disappear in the future. So that's why it's worth keeping looking at to see does this maintain or is it actually disappear over time this affect?

Unknown Speaker 20:12
Sharon Dixon, who we'll hear from shortly talked about the BMA. So the British Medical Association survey, which showed that 91% of women doctors have experienced sexism in the form of patronizing comments, being overlooked for career progression and being ignored by patients or colleagues in favor of male staff. So there seems to be a big issue in the medical profession about how women experience their jobs and how women are treated.

Unknown Speaker 20:36
This issue about equality is not just affecting to doctors. It's also the representation of women in clinical trials in some areas of medicine, like in heart attack, research, stroke research, where women are considerably underrepresented. And that's quite an interesting issue that in some ways might not be fixed. Because some of the treatments we use, we're not looking and researching them anymore. And it's interesting, when I did my DPhil, is actually women, on average, had the heart attacks about 10 years later than males. But actually, they go into later life, they had much more events because there was more of them alive. But actually, they tended to get undertreated and underrecognized, as you get older, and so it's not just being female, it's also the age issue that comes with treatment. So that interaction is quite important as well.

Unknown Speaker 21:23
Sharon Dixon is a GP and academic who's researching women's health. I spoke to her about the impact of gender bias in health care.

Unknown Speaker 21:32
If you look at other health issues, and I think Heart disease has been quite well studied here, you know, the British Heart Foundation finds strikingly different outcomes for men and women in the experience of heart attacks, women presenting later to doctors, they're less likely to be treated or recognized initially as having a heart attack. But also even once they've had a heart attack, they're less likely to have the recommended treatment or prescriptions. There's a study done on a large database in the United States, which also shows this gender discordance in terms of outcomes. So where women with heart attacks between 1991 and 2010, Greenwood showed that women had higher mortality when they were treated by men, but men and women had equal mortality when they were treated by women. And fascinatingly, that study showed that the effects could be mitigated, either by gaining experience of treating more women or working in teams where there were women, there's the question of representation. I mean, one of the things that strikes you in this paper is that there are just more male surgeons doing more operations. We know that about 46% of UK, registered doctors are female, but only 13% of Surgical Consultants. But it is really important to recognize that that's a big step up from 3% in 1990, but I think there's still a gap between the trainees and becoming a consultant.

Unknown Speaker 22:49
I can't really speak for hospital populations given I'm a general practitioner, I'd like to think in general practice land, and particularly where I work in urgent care, it's just a different landscape. And it's a different environment, primary care. So I think in terms of what there was mentioned there in hospitals, there are obviously issues to think about look at that are important in terms of great not quality in the workforce. But my other point was, I've seen this, what I call it, the evidence to implementation gap occur consistently in medicine, is that you have evidence of something that works, for instance, treatments in heart attacks, and they're just not implemented to the level where you're maximizing the gains, there's always a shortfall. And somehow what happens is people are looking at a brand new treatment or some new innovative technology and not going actually, we've got an issue here. Why are women not being treated appropriately when they have an acute coronary event, and that's the evidence do implementation gap that actually should be closed. The problem is, we seem to have made it very difficult to do the research in these areas, because it's become very costly, difficult to do. And it doesn't come from the ground up, it tends to come from the top down and therefore doesn't match what actually would work on the ground. And so I think there's something about how do we get this evidence to implementation gap closed. And I think an area of research that seems to be very big across the board is, particularly in terms of what happens for women, making sure they get appropriate treatments that actually do lead to the gains that they should get based on what the evidence is at hand.

Unknown Speaker 24:19
As a woman with a vested interest in this sort of thing, I take some hope from the fact that things are improving, but also I think it is a call to continue doing research in this area. And to think really about all the places in the pipeline, as Carl talked about there, the evidence to implementation part being one where women are being underrepresented in the way that we collect evidence and that includes from drugs not being tested on them because of fears about pregnancy all the way through to what evidence based treatments are actually given to them in health care.

Unknown Speaker 24:49
There has been a lot of areas we've worked with particularly patient groups where there's been harm done to women. We worked on a drug called Primodos hormone pregnancy tests, but then there was the surgical transvaginal mesh

was also a big issue and the sodium Valparai issue in pregnancy, there's a lot of exposures and interventions that hav e created significant harm over time.

Unknown Speaker 25:12
There was also a systematic review by Fitzgerald and Hurst that showed that healthcare professionals display the sa me level of implicit bias as the general population. So should we be expecting that our health care professionals are i mmune from gender bias in some way?

Unknown Speaker 25:26
I think where I started going back in the 90s, there was some sort of reflection that somehow doctors were super hu man beings and had some status that was different to everybody else. And being one myself, it couldn't be any furthe r from the truth, to be honest, you know, we have problems, we have families, we have all the issues that everybody else faces. And I think what you have to work hard to do and what I tried to do, every time I have an encounter in m edicine, I often try to just treat it as though that person is like my mother in front of me, it's hard to do that, you've go t to be really neutral, thoughtful, and think in that moment, I'm your advocate, I'm going to do the best for you, as th ough it was my mom, often though, it's life stresses all of the issues that faces mean, we can let ourselves down some times and have to spend a long time reflecting on yourself. And as I got older, it's got a bit easier to understand how t o do that well. But I think if you introduce bias in how you treat people, or judge people, and you can do that really e asily, you can't give them the best treatment. And you certainly can't give them the best available treatment based on what should be done there and then. That's why I like the evidence based approach, though, is because you know, in this situation, this is the best evidence I can share with you to inform their decision, what I wouldn't do is take obser vational research and say, I'm going to share this but often we do do that. And that's part of the problem, because we want to somehow intervene to make things better for people when the evidence is unclear. As you're younger, and yo u're coming into the world, and you're learning and you're becoming more experienced, you can feel very anxious as a doctor and you think, Gosh, everybody needs to go into hospital. And there's real problems and actually tend to ov er refer over test and over treat. And as you become more experienced that wider perspective allows you to be more balanced about the decisions, and particularly how you communicate with people. You know, it's a bit like having ch ildren, makes you feel, I think, a better doctor, when people present with their children, younger children, you can un derstand the issue they face. Before, I was looking in a textbook going this is what I'm supposed to say right now. A nd actually, the reality on the ground is radically different when somebody's coming in with a brand new baby. And t hey're six or eight weeks old. And I'm thinking, Yeah, I understand. You're totally lost, stressed, you're anxious, ther e's no manual, there's no book and you think your baby's about to die. And I can understand what that feels like. And I think that's the bit where we can share our stories to help people as you gain that experience. So you go on that rig ht path, particularly to be able to be the word is empathetic with people so you can take on board what their concerns and fears are, you can't necessarily do anything about them, but you can understand where they're coming from. An d that's where I think the wider experience in many areas makes it a much better workforce.

Unknown Speaker 28:01
What do we think are the main learning points from this paper?

Unknown Speaker 28:03
One was some of the challenges around particularly retrospective cohort study. So just observing what happens base d on data that's already been collected, and how it's really sometimes hard to uncover the truth or causes from that. A nd the other, of course, is just that point about absolute versus relative risks and wanting to have both in mind when we think about what it actually means on the ground.

Unknown Speaker 28:24
Yeah, I think that's fair. I think being critical. Don't believe everything you read in the news. Think about just simple things even asking simple question like what type of study was it? And it's a relative effect, it's of what? What was j ust the baseline risk here? What are the and they said that deaths are really low. And then the more generic conversat ion we've had about the complexity of work and the workforce and exposures and this idea that actually maybe most of the benefits we can gain are from thinking about how we implement evidence to those particular groups that have been disadvantaged, whether that's by gender or ethnicity, there are lots of issues where we could improve how we did health care if we made a more balanced approach to what we do next. As opposed to thinking about some brand new innovative treatment, let's close the evidence to implementation gap.

Unknown Speaker 29:10
So to conclude, it's not untrue to say that women are 32% more likely to die after being operated on by a male surge on. But stating it in this way exaggerates the original finding. It seems this much more headline grabbing figure has been reported in the media without a thorough explanation of what it means we're again reminded that it's important to approach all sources, both in the media and academic sources with a critical eye. That's not because they're always inaccurate, but each method and each study has their own intricacies that weren't critiqued. Everyone we spoke to th ought Wallace's study was well conducted, but it's ultimately limited by its retrospective design. Nonetheless, it has contributed to a growing body of literature that indicates the gender gap in health. As ever, we need more and better research to understand why women seem to face adverse outcomes just by virtue of being female. Thanks to Jamie a nd Carl for discussing this with me and also to Sharon, Sunil and Emily for sharing their expertise. And thank you fo r listening. For more information about our reseach, teaching and postgraduate courses please visit www.cebm.ox.ac. uk. Please subscribe to Itunes and stay tuned for our next episode.

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