

Podcast: Using Implementation Science to Move Environmental Health Discoveries into the Real-world

[Intro music]

Ashley Ahearn (Narrator): You're listening to Environmental Health Chat – a show from the National Institute of Environmental Health Sciences that explores the connections between our health and our world.

I'm Ashley Ahearn.

Modern medicine is based on hundreds, even thousands, of years of scientific research – each new development slowly making its way from the lab into widespread use.

The mammogram you might get. The CT scan. The vaccine. The ultrasound – name any common treatment or medical practice. Now: think about the fact that at some point that practice or technology had to make the jump from the lab to your local clinic. It had to be vetted, scientifically accepted, and then *implemented*.

That last step – implementation – is what we're diving into today. More specifically: the field of implementation science.

Basically, it's the study of how new ideas and research findings are adopted by public health and medical professionals and accepted by the public, more broadly, to improve our health.

Lindsey Ann Martin got interested in implementation science when she was working at a research center at the Michael E. DeBakey Veterans Affairs (VA) Medical Center in Houston, Texas. With a Ph.D. in anthropology, she was part of a research team where psychologists were studying how to implement video telehealth. They wanted to better reach veterans struggling with mental health conditions who lived in rural areas.

Lindsey Martin: Which was a big problem if you live in a rural area, and you have to drive to a VA facility to try to get your care. And sometimes you would be on the road for one or two hours at a time just for one appointment. And so video telehealth had the potential to really be a game changer in that area by increasing that access.

Ashley Ahearn: When Lindsey was at the VA, video telehealth was still a relatively new technology.

One barrier to implementing it was reliable internet. Many of the veterans had patchy internet connectivity so the researchers experimented with different options to boost their internet service, like wifi hotspots. Another barrier:

Lindsey Martin: There were concerns about building rapport over video, how do you make that connection with a patient over video?

Ashley Ahearn: The researchers worked with clinicians to start to overcome that barrier and they could see that mental health treatment could be done over video in many ways like it was in-person.

Lindsey Martin: When I would interview veterans, you could really hear how much of a difference that was making, that they had that access, that they could talk to someone, they could see them over a video screen, but not have that two-hour drive in their car each way to get to a VA facility.

Ashley Ahearn: For Lindsey, her work with the VA was an important, professional experience that got her hooked on implementation science – and the value of studying how new ideas and new technologies can best be introduced and put into practice.

Lindsey Martin: And so, what I took away from that experience was as an implementation scientist, you're able to be part of that process where you're speeding up research translation, you're actually closing that gap in care, you're identifying and addressing barriers that may prevent the intervention or the practice from reaching those who need it most.

Ashley Ahearn: After leaving the VA, Lindsey joined the NIEHS as a health scientist administrator in the Division of Extramural Research and Training.

She's become increasingly aware and committed to applying implementation science to the world of environmental health.

Lindsey Martin: When you think about the field of environmental health science, researchers could design an intervention to mitigate exposure to toxins affecting a community, so it could be a community that may be located near a Superfund site, or large industrial complex that could be experiencing high levels of exposure to lead, for example.

Ashley Ahearn: So, if a community has high levels of lead, in the water or in the soil, there's enough scientific evidence to know that that's a bad thing for human health. The key question, for implementation scientists, is how do you work with community members to bring change in ways that might make them safer? For example, by removing lead paint, cleaning up contaminated soil, or drinking bottled water.

Say there's an educational program that's launched to help inform people about how they can keep themselves safe from lead exposure. Lindsey refers to that as "the intervention." Implementation research then looks at the strategies or approaches to help increase adoption of that intervention:

Lindsey Martin: But the problem comes when the community may not widely use the intervention. And so then the impact of it is really reduced. And so, for example, maybe the community thinks that, the educational intervention is not written in the right way, or it may not be very user friendly. And so this is where strategies can be used within the field of implementation to really study, what are the best strategies to help the community adopt this intervention so it can be then scaled up and spread more widely to other communities.

Ashley Ahearn: Implementation strategies could include building a community advisory board or holding community townhalls to talk about the educational program and what it can do.

Lindsey says that work like this could become even more important in the face of climate change as extreme weather events like hurricanes or flooding threaten public health.

Living in Houston, she experienced some extreme weather events, firsthand. She was there when Hurricane Harvey hit in 2017.

Lindsey Martin: And so this is an area, the Houston metro area, is really prone to catastrophic flooding from extreme weather events, whether it's an extreme rain event, or it's due to a hurricane or a tropical system that comes through the area. And so when you think about that context, it's really when the natural environment, the chemical environment, and the built environments all collide in this one moment, and the devastation is absolutely unreal. And so is the uncertainty that you feel as an individual, as you're surrounded by these floodwaters that that may be toxic, there may be chemicals in the water. And the air may not be safe to breathe from industries that release some of their emissions during these events.

Ashley Ahearn: Lindsey sees an opportunity for implementation science to play a role in helping communities adopt research and information that can help them protect public health during catastrophic events in the future.

Lindsey Martin: It could be developing a series of educational materials that are designed and target communities continuously hard hit by hurricanes, it could be a website, for example, or other types of educational materials. And this educational intervention would inform the community about what can be lurking in the floodwaters or what can be in the air that you breathe after these extreme events. And so that's where researchers could then come in with an implementation science study that evaluates different strategies to help the community more widely use this website, for example. With the website being the intervention that has that goal to build community resilience before the next hurricane strikes.

Ashley Ahearn: Lindsey has a couple of key take-aways for environmental health researchers thinking about how to make sure their findings are adopted and put into practice.

One important thing she's learned, in her years as an implementation scientist: any intervention, in order to be successful, needs to be grassroots and tailored to the community it's serving.

Lindsey Martin: It's not something that comes from top down. It's not researchers saying we think you need this. No, it has to be done in partnership with communities so it works for them, meets their needs and their priorities, and it's something that they want. Because implementation will fail if you don't have what we call buy-in.

Ashley Ahearn: And then, once you have the buy-in, you've also got to be thinking about sustainability, Lindsey says. How do you make sure that the intervention stays in place, and is used beyond the lifespan of the research project or funding cycle. Basically, she says it's important that the new idea, guideline, or practice actually sticks.

Another key thing for *any* scientist to consider. Don't make implementation of your research an afterthought:

Lindsey Martin: Always be thinking about implementation, even when you're earlier on in that that research pipeline, even when you're doing efficacy studies, or you're doing effectiveness studies, always have that eye towards implementation and think about that how question, how can I make this work in the real world?

Ashley Ahearn: The field of implementation science is growing, as more researchers become aware of the need to get their findings from the lab bench to the lives of the general public.

Perhaps nothing has made the importance of implementation science more clear than COVID-19 and the current pandemic. It has presented a challenge for public health experts who want to get people to adopt basic health precautions – like wearing masks, and now, getting vaccinated.

Lindsey sees the virus, and pandemic, as a cruel teacher – but also a learning opportunity for implementation scientists.

Lindsey Martin: I mean, I think it has the potential to really show us how implementation science can be used in the context of public health disaster response. And so, it's really looking at trying to make change in real time, because at times implementation research studies, you know, they can go on for a couple years, and so this has been a time for implementation science to really think about how to engage with more rapid types of research, to be able, in times of crisis, to be able at that point, take the methods that have been used and really do so in a quicker way, in a more rapid way.

Ashley Ahearn: One study found that it takes 17 years to turn 14% of original research to the benefit of patient care.

COVID-19 has shown us that time is of the essence when it comes to implementing valuable new research.

I'm Ashley Ahearn. Thanks for listening to Environmental Health Chat.

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