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Digital Disruption in Public Health: Innovations and Challenges - APHA 2023 Podcast
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[musical prelude]

AM Hello and welcome to this new podcast of the American Journal of Public Health; and with my good friend and colleague, Vickie Mays, here we have our two guests—Enbal Shaham and Este Geraghty—who have had a session related to public health goes digital. And they are actually talking about the challenges for public health of what they call new disruptive and a novelty technology. So, my first question is what are those?

EG Well, I guess I would probably define disruptive technologies as technologies that just make you think completely differently. They blow up the current work flow or situation into something totally new; and then I would say innovation—disruptive is a part of innovation, it can be, but innovation can also be much more simple. Innovation can be a streamlined work flow; it can be a new user interface; just a different way of doing something but it doesn't have to blow it up every single time.

ES I think one of the challenges when we hear disruptive, people get scared; and I think that's, it's just thinking differently, and I think that we have new technology and we have new opportunities to think differently and do things differently with a better outcome.

AM People think immediately Chat GPT. I mean you say that now it's, uh, yesterday we had a session about artificial intelligence, asked the audience, was packed, how many of you use it; almost everybody raised their hand. So, is this what you're talking about when you're talking about disruptive?

EG It is the perfect example; I think everybody can relate to it because they're starting to use it quite a lot now. But there are other technologies that I would say are also disruptive that we all

remember in our recent past. The example that comes to my mind is the Johns Hopkins University dashboard for COVID-19. And while the technology has been there for a while, what was disruptive about it was that Johns Hopkins one, collected the data themselves, and who were they to be the ones to collect all of this global health data; they made it real time, fully shareable with the public, and displayed in a way that everybody could relate to. It was a different way of thinking about a problem, and it inspired the world to create math-based dashboards to represent the current cases for COVID-19 and the spread of the disease.

ES I would add that now we expect everyone to have a dashboard and it to be real-time. And the challenges that we are in public health and I would say all of healthcare industry is not usually used to sharing real-time data; but the population wants to see it. We want to see it as the public, and so I think that's been one of the challenges of when you disrupt the process, we expect to see that real-time data. We want those data to be publicly available. It's a missed opportunity, but I still think that there's a lot of movement.

VM Can you talk a little bit about what the uses can be in terms of public health giving to other people that usually don't get it by having the use of technology. In healthcare, that's been a big benefit, is we have telehealth, we have all these different ways we're bringing people in. So in public health where we reach out, what are you thinking about as being disruptive and innovative?

EG There's probably a thousand examples, so I'll just pick one that's close to my heart, okay. And I think a lot of people are talking about this, that instead of the way that we traditionally like to share data in our risk communications or any kind of public communications, there's been a new emphasis in storytelling with data; and so I think technologies that support this storytelling, this narrative and lived experience so that you do have that part, the personal part, along with the data

and maybe interactive maps and other graphics. They build a context around the data that we've always held, and it makes it more understandable which, I think, is also potentially disruptive for public health but you build engagement, right, and you get that community involvement that can move initiatives forward. So, storytelling for me is one of those disruptive methodologies, almost, I would say.

VM Love it. Enbal?

ES I have the example of thinking about how do we get, where is the challenge, where are the people who need the biggest health information or the health innovation, if you will, right? So if you think about understanding how social media or social sensing is what we're calling it, thinking about what are people saying and where are they saying it, every piece of data or every social media post is anchored geospatially. So, if you think about aggregating that and understanding what are people talking about and what are they thinking about, whether it's a vaccine or any sort of health information, we can understand how to deliver that information to that community in a different way because they're saying and talking about these things in real time. So, I think about HIV prevention. I think about PrEP right? The dissemination of PrEP and the uptick has been slow, it's still slow, there's a lot of people in need. And I think why aren't we responding to where they are, when they are, and building that infrastructure to deliver that sort of care? It's an opportunity that we get to grow on.

AM But maybe it's slow also because it's just top bottom approaches. What about the bottom up? What about the possibility for the community to use these to explain what they need and how they would like intervention to be implemented?

ES I think that's exactly what's happening, right, so if people are talking about it on their social media accounts, we should be listening—not in a creepy way but in the idea that it's, I'm

listening and thinking about where and what you need in real time. So, how do we deliver those interventions to the places in need. I think historically, we've looked here are the sexually transmitted infection rates; we have to translate that into prevention efforts on the ground, right? And engaging in community partnerships: How do we figure out which local health department is working in this community. All of that is important and this is complementing those efforts.

VM But let me actually challenge this a little bit, because when we think about infectious diseases, this is where we actually saw this stuff just work really well, and we start thinking about the age of the population, who really embraces this. But if we start looking at chronic disease and how quickly or slowly we can get that data and the age of the population, how can we be disruptive there?

ES So I think chronic disease is one that we haven't really embraced understanding the real-time movement under exposure. What does my daily life look like, where we work live and play? Those data exist; we carry them around with us all day. We are missing the opportunity right now, and this is a disruptive technology that says my smart phone can give me insights on what I do, how I act, what I think, what I see and feel probably, and then translate that into am I going to exercise today, am I going to be physically active, and is my mood positive; is it sunny, does that make me want to go outside and play. Right? So that piece about physical activity is important for chronic infec—or diseases, not infections—but I think if we also add what am I exposed to, what's my environment like, and thinking about is this a health-promoting environment. So it's not just are parks available and trees available but do people in my neighborhood have the time to go and go to the grocery store and prepare their foods or what does it look like, are there opportunities around me for health promotion. And most often, we have very inequitable environments, so building that equity in environment so we can make

healthy choices is one of the disruptive technologies is—well, have been but is really anchored in location and better understanding what our environments are feeding us.

VM I think those are great examples. I mean part of what, you know, in some communities, we see people doing this, trying to get people to see where can I buy my food and get it on sale, you know, right now everybody's complaining about the cost of food. Can I go and exercise, and it's like what's available and how far and using a phone to say you walked a mile, and encourage people. So, I'm glad to hear because most people like to like to you know say I don't see how it's with chronic disease, so thank you for those examples.

AM But in practice, how do you do this? I mean how do you make this available to communities, if I understand well, and how do you know that it works?

E That's research, right? Um, you know, we have to figure that out. I think we should be testing these interventions. I think we know how push notifications work some of the time, right? They work well and then they stop working well; but we also know there are lots of data looking at how there's a threshold of how much people are going to listen to you, but if you bring it back and do something new and maybe thinking about the context of the story of how people live and experience these moments, I think that's part of it. The other piece I would just highlight is the healthcare extension, right, the home healthcare extension is that. Some healthcare providers are using these activity trackers and getting that data for their patient interactions; and that's just a piece of it, and I think it's an important piece.

EG And, I think you answered very well how do we know if it works, and that's research. How do we get it out there? I'm going to say that's marketing. And I think that public health maybe doesn't always do the best job of marketing themselves, marketing the good work that they do. I mean, everybody's so busy doing the good work, that they're not spending a lot of time on that;

but I think when it comes to getting the word out to communities, you have to take a geographic location-based approach so that you can target your message based on what that community composition is, what their needs and desires, lifestyles, behaviors are, what their information channels are. And this is all geographic information. It is available, so that you could know one message to this community is going to vastly different than the message to this community, but the goal is to get them both aware of what's available to them. So, marketing and using a location-based approach for that can be very effective.

AM We certainly would benefit from more marketing, I totally agree. But you seem to mention that there are also risks associated with this new technology. What are those?

EG You know, you could start with chat, with Chat GPT. I think, I won't say the risk of takeover the human race, but the risk in general is that it gets out of hand, but even a more immediate risk is that it's improperly trained on models that do not account for the diversity in our population so that the decisions are not vetted in a way that you will end up with unintended consequences. Other risks that I think are commonly brought up with technology are privacy and security risks. Health data is sensitive, and it is always a balance between innovation and privacy; and how do we do that. Because of course, the more granular data we can get, the better analytics and information we can glean from that, but we have to be respectful of the privacy issue. So, how do you do that? It's not the easiest answer, but I think people need to be more aware of the privacy regulations, because I think the automatic response is no, but to become more aware of those regulations and work with their technology vendors to ensure that the solutions that they put together are privacy by design. Right? I mean they're built to do these things by design and people will feel more safe that way.

VM Can you give people examples of places or things that you would say use this, this could be—I don't mean a particular but the phone, what are some of the different things?

ES So, we have an app for just about everything, right, so you can imagine you could collect data about yourself. I think that's helpful for lots of people. I think we're not using early sensing in a way that we should, right? So, during COVID dashboards, they told us where and what and who, sort of; and then we translated that into local images of where the challenges are, and then we stopped. Right? We decided we didn't need to know; we don't have a good measure of testing; we don't know how many positives. We don't know. Thinking about that is what are the other measures in our community that can give us a sense of is this likely for an exposure of any sort of outbreak; and in an emerging infectious disease, we should be thinking about that all the time. So, I want you to think also about different ways of identifying what an emerging infectious disease could look like in different contexts. So, one of the things I would consider is MERS coronavirus. It basically stopped infecting people even though we had a recent case announced but we haven't seen anything since; we know that with the climate change, places are getting hotter and drier and camels seem to be endemically carrying MERS-CoV. So, if we think about that, what do we need to know? Where are they? What are they doing? That's mobility. So, can we identify those patterns of movement; can we identify the population that may be at risk. And then start being able to monitor more proactively. So it's the same type of thing I would argue that you could do for good using these data in our communities and saying look at the people moving around in your community. What are the structures that physically look to promote health in that community or the next community.

VM Yeah, it's like asking people of the community say you want a heat map or you want, you know, you want to ask that your weather be presented to you in a way in which you can really tell,

because people, it's like how do the community know the things to ask public health to do. We are very familiar with transit maps now, so let's get them in terms of health knowing all these other things to ask for. Go to the department of public health and say I want a heat map!

ES You know my response to that will be probably expected from me but when you say what should we tell them, use this, use a geographic approach, think about your problems as spatial problems to solve. It is for many, strangely, it is a whole new way to think about your data; and people do get it when you say okay let's think about the social determinants of health and everybody knows that they are distributed in a non-random way. And they need to be addressed in spatial ways, but they don't often extend that to other public health challenges; how do we think about that from a location-based perspective, and yet everything happens somewhere, right?

AM Yeah but we had an issue of the Journal about dashboards that we published last year, and so we have all those different experiences, and I like the analogy that the associate editor, [Nafez] Gupta made because he said they are so different from one place to another is that it's as if when I went from New York to Oregon, it said that I passed, I had to use a different weather app and it would be organized differently. Now we use the same weather app, whether, and we can interpret it the same way, but those dashboards they are so different, it's very difficult to actually integrate the information.

EG It's actually not difficult to integrate the information, and we did that with CDC. We took, we offered free to states across the country to standardize their information and many took us up on that. What is difficult—what, I think actually you're making the point for geography, because every dashboard is localized to the needs of their community and maybe has different design features that could be standardized. Part of the point is that you want to localize that information. But, I also do understand and agree with the bigger picture that if you want to look

from a national point of view, you have a lot of challenge in doing that. So, what is the answer to that? I think that's partly cultural and political, because you know we live in a country that is focused on states' rights and, in many places, county rights even trump state rights. So, people don't necessarily want to nationalize or integrate all of their data, yet the technology does make it possible. I think it's more of a cultural and political issue.

AM I want to say that there is actually more bipartisan support for federal collection of data. I think we probably can recognize that this is a role of the [states] and that we need the data. I mean, those who agree with data. I think there is more support for that than you may think.

EG No, I think that the pandemic showed we need that. I certainly hope there's a lot more support, but I think we have a history of not doing it that way, and there's a lot of muscle memory out there. The more we go in that direction, the better, from my perspective, just because I think standardization when you look at technology and the ability to make better decisions that are relevant across a large swath of the country or even the globe, it's going to be important.

VM I think all of that is going to require that data privacy at the forefront of it, because I think that's, you know, when you say geographic, people get a little nervous, and so to the extent that the data is hand in hand with privacy and consumers understanding how to protect the data, and the check box that you were alluding to, it's like understand what it means when you check that box; please read it.

EG Yes, well I mean I just have to say that data privacy has three components: People, process, and technology. The technology is one component and absolutely you want to make sure you have secure technology and you know how to use it properly; but you also need people who are trained and do understand the regulations; and you need process. You need governance procedures at an organizational and higher level that tell you how to behave or how not to

behave. And I think a lot of people just put it on the technology, and if it's safe it's safe and if it's not it's not, and they forget that a lot of breaches of health data are human error. Nevertheless, I think we need all of those components, and I think when it comes to geography, you're absolutely right. It is listed as number 18 on the 18 identifiers by Safe Harbor; but people forget there's another side of that. There's expert determination and that is perfectly legal, but it's harder because you must justify your decisions but you don't have to have perfect anonymization of your data. You have to have very low risk of re-identification, and there are many methods that you can use. In fact, we just put out two tutorial lessons to support learning how to properly geocode health data so that you don't breach privacy and how to de-identify data at different levels like in polygons and even point data, how you can jigger those on a map and keep your spatial patterns but not breach the privacy of the individual.

ES And I'd just add that we have a lot of data now that is not traditionally identified as health data. So, when we consider using our smart phones for example, we check that box and use the apps, right? We use, we need to know how to get places; we rely on that all the time. Truly, we don't feel like we have choices, right, because I want a phone, I want a way to get somewhere. I could go the antiquated route, I could. And that might be disruptive in today's technology, right, to choose not to use it might be more disruptive than to use it, but those data are being collected and used to sell me sneakers all the time—oh, you went and looked here and hey you're walking into this building, you should probably consider that you should be buy these new sneakers. But we could also identify the health patterns, and that is not currently considered health information; and the sensitivity of that needs to be considered in a way that we should be planning that process and we should be planning how those data will be used in secure ways.

AM I find this fascinating, because you have a vision that goes far beyond the one we have, I mean at least the people I can represent, and I think I have a pretty good notion of where we are, but you see beyond the state where we are now. In this pandemic, I mean we've identified one of the greatest problems was the absence of population-based data to monitor the progression of the pandemic. We've never known how many people were infected with just asymptomatic, et cetera et cetera, and apparently you have a vision for how we could unite all those local dashboards into a global dashboard. Is this what you're looking for?

EG Sounds like a dream!

ES Doesn't feel very disruptive, though. It feels like the obvious next step to me.

EG Right, doesn't it seem like it would make sense.

AM And that's great because if you sense something that it could be the next step, it's going to be so.

VM Thank you very much.

AM So thank you very much for listening or for looking at this podcast. We are here in Atlanta 2023 Annual Meeting of the American Public Health Association, and Vickie Mays and myself who were interviewing Este Geraghty and Enbal Shaham about public health faces digital.

[musical postlude]