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Weighing the Environmental Impact of Colorectal Cancer Screening Methods

Dr. Buch:

Welcome to *Clinician's Roundtable* on ReachMD. I'm Dr. Peter Buch, and joining me to discuss the environmental impacts of colorectal cancer screening with colonoscopy and multitarget stool DNA, also known as mt-sDNA testing, is Dr. Mark Fendrick. He's a Professor of Internal Medicine and Health Management and Policy at the University of Michigan. Dr. Fendrick, we're so glad to have you join us here today.

Dr. Fendrick:

Thank you so much for having me.

Dr. Buch:

Starting with some context, Dr. Fendrick, why is it so important to consider environmental impacts when screening for colorectal cancer?

Dr. Fendrick:

The healthcare sector is responsible for over 4 percent of the global carbon footprint, and as we think about ways to reduce that impact, we would hopefully prioritize lower carbon options when there are multiple choices available to us as clinicians. So one of the first areas that I decided to look into to explore this agenda would be screening average-risk individuals for colorectal cancer screening because, as you and most clinicians know, there are multiple evidence-based, guideline-recommended ways to screen for colorectal cancer. Colonoscopy remains the most prevalent. Stool-based testing, including stool DNA, is also one of the more popular options. So when you have a guideline that's recommending multiple things, certainly, we as clinicians think about clinical efficacy. Patients always think about convenience and cost. But more and more often, if you talk to our patients, and consumers in general, they're looking for a green option. Whether it be choosing cosmetics or the milks or the type of protein they ingest, people are really trying to find lower-carbon options, particularly if they could get the level of satisfaction in general or same clinical outcomes, specifically when it comes to medical care in making those choices.

Dr. Buch:

Great. And one of the important things that I just want to discuss with you is that the United States is in the minority when we're talking about colonoscopies. Most of the world does things like FIT testing first, and if it's positive, they go on to colonoscopies. Could you please comment about that and the environmental impact?

Dr. Fendrick:

Not only do we have issues of access, convenience, geography, and environmental impact, but one of the things that differs in colorectal cancer screening than other cancer screening modalities is the fact that the number of colonoscopists and the number of colonoscopy slots are largely fixed. And those colonoscopy or endoscopy slots can be used for a number of things, as you mentioned. They could be for emergency procedures like GI bleeding. They could be done for patients with inflammatory bowel disease.

And then we have two specific types of colonoscopies that I've been focused a lot on pertaining to screening. One would be initial screening, and that is your first test, or the way they use colonoscopy and screening in other countries, which is largely a follow-up colonoscopy after a stool-based test. We have limited numbers of colonoscopists and colonoscopy slots, we have a gigantic backlog of

screening related to the COVID pandemic, and we have the United States Preventive Services Task Force within the last few years, lowering the age of average-risk eligible individuals for screening from 50 to 45. That added 20 million Americans who are recommended for and eligible for no-cost screening. So given that we are not expanding the number of colonoscopy slots, what I have been advocating for is that we actually do fewer screening colonoscopies as the initial test; we do more noninvasive initial colorectal cancer screening, which is lower cost and more convenient for patients, and reserve those limited colonoscopy slots for these higher-risk patients of those who test positive on stool-based tests, such as stool DNA.

So when you think about that strategy to achieve population health, then we also see what might be the environmental impact of the choice of these modalities, and our work clearly shows that the environmental impact of a screening colonoscopy is substantially almost 60 percent higher than those two stool DNA, even when you include the follow-up colonoscopy on those minority individuals who test positive on the stool test. It's really important to note to show the difference in environmental impact between the home-based tests and the colonoscopy as initial screening is that the contribution of the environmental impact to the entire stool-based program, which includes follow-up colonoscopy, a majority of the total environmental impact, or two-thirds of that carbon footprint, was related to the follow-up colonoscopy, not the stool-based testing itself. So you can see there's an incredibly strong argument that if we want to reach some of our goals of getting colorectal cancer screening to those eligible individuals, it's a much better idea for efficiency and it's a much better idea for environmental impact to stress the idea of noninvasive screening first and reserve our precious colonoscopy slots for those who would benefit the most, that being those who have tested positive on their stool-based tests.

Dr. Buch:

So with that in mind, what factors contribute to the carbon footprint of colonoscopy and mt-sDNA testing?

Dr. Fendrick:

As most clinicians understand, whether they've performed colonoscopy, referred patients for colonoscopy, or in my case, undergone colonoscopy, this is a very intensive procedure, not only clinically, but for the resources that are needed. Fortunately for us, in our research, there has been a number of very rigorous empirical studies tracking what resources are necessary to perform a colonoscopy, and we were able to use those data and compare them to very similarly detailed information about what it takes to manufacture a stool DNA kit and how much it actually costs in terms of freight, travel, in terms of carbon emissions to fly the kit to the patients. The patients either have to return the kit to a mailing spot or have someone pick up the kit, which requires carbon emissions from vehicles, and we really went above and beyond to try to get an accurate estimate to compare what the carbon emissions might be. So when we made our ultimate comparison, and found that there was a 60 percent increase in total carbon emissions for colonoscopy compared to the stool DNA test, something that would be relatively conservative.

There are lots of factors that we clinicians and our patients have to consider when getting colorectal cancer screening. It's still most important that people get some form of evidence-based screening compared to none, given that we have a substantial minority of eligible patients who don't get anything, but when it really comes down to choosing which modality to get, stool DNA testing are becoming more and more accurate. There are the issues of convenience that many patients would prefer to do most things at home—not just colorectal cancer screening—just the advent of home-based programs in many of the conditions that we try to prevent and manage. And then there is this issue that's very important in that if you undergo colonoscopy, you could have a polyp removed and actually complete the screening process in one procedure.

In the case of the minority of patients—somewhere between 5 and 15 percent—who test positive on stool-based tests, it's absolutely imperative that those patients undergo colonoscopy. So the people who test negative on stool-based tests, their environmental impact is practically zero. And as we found in our study, nearly two-thirds of the environmental impact of a noninvasive initial colorectal cancer screening program that includes an estimate of 100 percent follow-up for screening colonoscopy, which is a dream of mine not yet attained, the follow-up colonoscopy is the major contributor. So as the stool-based tests become more specific, meaning that the number of colonoscopies needed falls, this environmental advantage for home-based tests on top of the convenience advantage and the cost-effective advantages really makes a strong societal argument to move initial screening from colonoscopy to stool-based tests.

Dr. Buch:

For those you're tuning in, you're listening to *Clinician's Roundtable* on ReachMD. I'm Dr. Peter Buch, and I'm speaking with Dr. Mark Fendrick about environmental considerations for colorectal cancer screening.

So, Dr. Fendrick, given the carbon footprint of each of these screening strategies, what adjustments can we make to reduce their environmental impacts while maintaining effectiveness?

Dr. Fendrick:

We have a number of issues that we need to deal with. One is it's pretty hard to convince individuals to undergo screenings, particularly for something that's asymptomatic. The good news in the United States is that colorectal cancer screening is no cost to eligible patients in a substantial minority. About 95 percent of people between 45 and 75 can get colorectal cancer screening at no cost to them. Very importantly, just in the past few years, there has been federal guidance produced that not only would be the initial colorectal cancer screening test be no cost to patients, but the follow-up colonoscopy is now free, although we still have issues in individuals undergoing stool-based tests to get the follow-up colonoscopy. We're very happy to see some preliminary data to suggest that removal of this financial barrier has led to a marked increase in the percentage of total colonoscopies that are dedicated to follow-up stool-based tests, particularly for stool DNA, so we're making sure the process is complete.

And then you have the issues of when people are choosing among guideline-recommended services, there are an increasing number of individuals who would like to know, "Among these recommended things all no cost to me, is there one that is more environmentally friendly?" And that was the ultimate motivation for this very rigorous study performed by my colleagues and myself. And what we could say for absolute certainty is that a choice that removes initial colorectal cancer screening from colonoscopy, currently the most common perform of initial screening, to noninvasive stool-based tests have tons of advantages. One: more people can be screened in total. Two: the colonoscopy backlog will be eased somewhat in the fact that patients who test positive on their stool-based tests will be able to get their follow-up colonoscopies not only more frequently, but more quickly. And then lastly: the financial implications to public and private payers would be advantageous in the fact that the cost per patient screened in a stool-based initial testing strategy is going to be lower than a colonoscopy initial screening strategy because the higher-cost test—the colonoscopy—is performed in just a small minority of patients as opposed to 100 percent of patients who undergo screening colonoscopy.

Dr. Buch:

And are there any trade-offs associated with those changes that we'd have to navigate in clinical practice? If so, how do you recommend approaching them?

Dr. Fendrick:

The various screening approaches, such as initial colonoscopy compared to stool DNA, are held on an equal platform, right? They are recommended equally in terms of first choice. And not only are they all no cost to receive them, thus again suggesting equality, but when you add to that the colonoscopy backlog that we have due to our fixed supply and many more people needing colonoscopy for a number of clinical indications, not just screening, suggest that we really need to reframe how colorectal cancer screening is delivered if we're going to achieve our goals of 80 percent, 90 percent—even for me, 95 percent of people to get screened—that involves a number of things.

First is, because of the supply of colonoscopists and colonoscopy spots, we have to do fewer screening colonoscopies and instead substitute those appointments with colonoscopy procedures that have higher benefits to patients, meaning leading to more polyp removals and also leading to more early cancer detections. And our modeling studies have shown that the more we push screening from colonoscopy to stool-based tests and expand the populations who get those initial tests, we see more people screened, more polyps identified and removed, more colorectal cancer screening, and more colorectal cancer cases diagnosed at earlier stages, thus leading to substantially lower spending on colorectal cancer. Because as all of us know that the cost and the efficacy of treating all cancers, including colorectal cancer, is better when you catch a cancer earlier. So when you combine these individual patient and population effects plus these new findings to show this really important environmental impact difference, it may provide more momentum for us to get more patients screened, more polyps removed, more cancers detected, more revenue for gastrologists for removing more polyps, and a safer and cleaner environment.

Dr. Buch:

Those are great takeaways for us to think on as we come to the end of the program. And I want to thank my guest, Dr. Mark Fendrick, for joining me to discuss colonoscopy and mt-sDNA testing for colorectal cancer and their environmental implications. Dr. Fendrick, thanks so much for joining us today.

Dr. Fendrick:

Such a pleasure to be here.

Dr. Buch:

For ReachMD, I'm Dr. Peter Buch. To access this and other episodes in our series, visit *Clinician's Roundtable* on reachmd.com, where you can Be Part of the Knowledge. Thanks for listening.