Data-heavy "wellness rewards" programs allow covert discrimination based on race, social class, and pre-existing conditions

Access to care is fundamental to health, and much of the work in *Medical Care* studies how to improve access among historically disadvantaged groups or how patients respond when access does improve. Unfortunately, even as governments and researchers work on existing problems, technology is enabling new barriers to access. Kaiser Health News recently put out an article about wellness rewards programs that use invasive personal information such as disease history, seat belt use, and grocery purchases. The article focuses on privacy risks, which are substantial. Aside from privacy, though, there is another crucial issue that they don't mention. Grocery purchases reveal information about race, social class, and even pre-existing conditions; basing health insurance prices on these attributes is possibly illegal and definitely unfair. It is impossible to implement grocery-based wellness rewards programs without implicit discrimination, even assuming companies act in good faith.

This column focuses on race as an example topic. According to market research by Nielsen, simple rules of thumb based on purchases of branded and unbranded produce, meat, and seafood could reveal information about race. Even worse, healthy eating scores produced by well-meaning health researchers, with no intent to discriminate, still stratify people by race. For example, take a look at this study, a small-scale Washington D.C. effort including mostly Black and White older women.

> Li, W., Youssef, G., Procter-Gray, E., Olendzki, B., Cornish, T., Hayes, R., ... & Magee, M. F. (2017). Racial differences in eating patterns and food purchasing behaviors among urban older women. *The journal of nutrition, health & aging*, *21*(10), 1190-1199.

The raw data are not published, but some back-of-the envelope calculations indicate that groceries could separate Black and White participants with about 68% accuracy (versus 50% by chance), subject to certain assumptions. For those wanting evidence on a broader scale, with more geographic, demographic, and topical diversity, a review of more than 100 nutrition studies explains:

> Accessing healthy food is a challenge for many Americans—particularly those living in low-income neighborhoods, communities of color, and rural areas.

Any honest attempt at grocery-based wellness rewards has a moral and legal responsibility to address these issues. Below, I argue this is impossible in theory given the state of the art about how to define "fairness" for a predictive algorithm, and impossible in practice given our incomplete understanding of health science.

On fairness pitfalls

Some people would object to this argument, saying that healthy eating scores are fair as long as they reflect biological impact of diet on health. Why bring in complicated considerations about race, class, and pre-existing conditions when we could be having a simple discussion about rewarding people who make healthy choices of what to eat? This is the crux of the argument, and in fact there are several reasons.

Fairness through unawareness does not work

First, the correlation between diet and health does not always indicate a biological effect: health effects of diet overlap confusingly with other possible causes. For example, a 2005 Medical Care article found higher rates of cardiac morbidity in Black patients, with Black study participants having over five times the rate of hypertension hospitalizations.

> Holmes, J. S., Arispe, I. E., & Moy, E. (2005). Heart disease and prevention: race and age differences in heart disease prevention, treatment, and mortality. Medical Care, 43(3), I-33.

If eating habits drive this trend, shouldn't that justify wellness rewards programs with different average rewards by race? Maybe, but in fact, eating habits explain only a fraction of the difference in health outcomes. The study attributes the difference to lower rates of revascularization surgeries in Black patients. In a situation like this, dietary proxies for Blackness may predict heart disease, and naive wellness rewards programs may follow suit in raising prices, even though diet differences are not causing the disease.

Fairness requires an impossible level of detail

Second, try to enter a room with a Black consumer and a White consumer and explain why it's fair that the foods one of them grew up eating will now cost her extra in health insurance. If they object, their intuition matches a carefully reasoned criterion called counterfactual fairness. To be "fair" according to this work, predictions must remain unaffected by changes in someone's "protected attributes", which for purposes of this discussion should include someone's race and their family's races. Crucially, the paper also recommends avoiding any measurement that depends on protected attributes. Assessing whether a family's food preferences depend on race would require a thorough family history project full of impossible counterfactual questions. Would your great-grandmother have borrowed that cookbook from her neighbor if she were White? Would she have even lived in that same neighborhood? Gone to that same market? Had the same amount of money to spend on food? Given the uncertainties involved, the only feasible fair practice is to avoid using groceries for wellness rewards.

Fairness suffers from the legacy of racism

Third, health research -- even completely reasonable and well-meaning health research -- is affected by our perceptions about race. Consider the following example, which is a large, geographically widespread, multi-

racial study of the associations between race, geography, Southern-style diet, and stroke risk.

> Judd, S. E., Gutiérrez, O. M., Newby, P. K., Howard, G., Howard, V. J., Locher, J. L., ... & Shikany, J. M. (2013). Dietary patterns are associated with incident stroke and contribute to excess risk of stroke in blak Americans. Stroke, 44(12), 3305-3311.

This is a careful and impressive piece of work. But, it prioritizes diet-associated disease in Black Americans, leaving other important questions unanswered. The first sentence of the paper makes the priorities clear: "Black Americans and residents of the Southeastern United States are at increased risk of stroke", and the authors want to know why. Unfortunately for us, ignoring health outcomes besides stroke can lead to strange findings. Another unhealthy eating pattern that the authors name "Sweets/Fats" was more common in White Americans. Despite summarizing items such as candy and desserts, "Sweets/Fats" consumption correlated with a *reduction* in stroke risk. The authors did not expect this, and their best explanation is that eating Sweets/Fats "protects" people from strokes only by killing them with cancer or heart disease before a stroke can happen. The implication: any wellness rewards program that accounts for this study could take its well-meaning focus on Black Americans' stroke risk and use that to impose higher health insurance prices, while essentially ignoring unhealthy choices common among White Americans. This could happen even if diet is guaranteed to be biologically causing strokes. Again, the problem is not the study. Through no fault of the authors, our understanding of nutrition and health is incomplete, and it's incomplete in ways that are deeply affected by race. Under these circumstances, designing a fair wellness rewards program is not feasible.

Summary

If we are going to charge some people more for health insurance, we have a moral and legal responsibility to ensure we are not penalizing them based on race, class, and pre-existing conditions. With a complicated grocery-based system, this is impossible: grocery purchases are wound up in our lives much too tightly for it to work. Even carefully designed healthy eating scores stratify people by race. Because correlation is not causation, "fairness through unawareness" is not enough to avoid unacceptable bias. People should not be penalized for cultural preferences, even those with a genuine causal effect on health. Even if well-meaning programs focus on causal effects of diet, the legacy of racism is baked into well-meaning health research, shaping whose diet and what health outcomes are scrutinized. Together, these problems make fair wellness rewards programs impossible.

This shouldn't be a big surprise. Discrimination has arisen time and again through supposedly neutral decision criteria. You may not agree with every claim out there, but examples abound, ranging from redlining, predictive policing, and drug policy to IQ tests and college admissions.

Call to action

Ideally, health insurers should abandon grocery-based wellness rewards. Perhaps they could instead focus

their efforts on making healthy food accessible and convenient for their members. If they choose to adopt wellness rewards programs, they should make their datasets, methods, and principles transparent so that consumers can decide for themselves whether programs are fair.

In the Houston incident relayed by Kaiser Health News, the city government switched to a separate program after a backlash. The KHN article cites objections from the police union and other city employees as key to that decision. The best way for consumers to regain power over their data is to get organized: only labor unions or other large-scale associations will have enough leverage to negotiate with large employers about institutional decisions on health benefits.