ANH Blog Post

Understanding population-level nutrient intake with greater precision

By Simone Passarelli

For many nutrition researchers, our analyses begin with dietary datasets. But as we know, there are enormous gaps in the availability of high-quality food consumption data. As a result, many researchers must rely on less-than-ideal measures, like food supply data, single-day recalls, or indices, which can obscure our results and conclusions. In our [recent paper in *The American Journal of Clinical Nutrition*](https://academic.oup.com/ajcn/advance-article/doi/10.1093/ajcn/nqac108/6605334?login=true), my co-first author Chris Free and I attempted to address this challenge by consolidating publicly-available dietary data on people’s usual nutrient intake in 31 countries, estimating what intake distributions look like for different age and sex groups, and making these distributions publicly available for nutrition researchers (I also recommend checking out a [great editorial](https://academic.oup.com/ajcn/advance-article/doi/10.1093/ajcn/nqac120/6604973?searchresult=1) by Jessica Fanzo accompanying the paper).

This is an important step forward, because the analyses that nutrition researchers do often require us to know more than just the average level of consumption in a population. We need to understand the full spectrum of a population’s nutrient intake—in other words, the shape of the distribution around the mean or median. We may need to estimate how much of a population is below or above the recommended nutrient intake; predict the impacts of a fortification intervention; or determine which segments of a population are most susceptible to chronic diseases. If we get the shape of the intake distribution wrong, we might grossly overestimate or underestimate what proportion of a population is at risk. Historically, researchers have had to make an educated guess about what the shape looks like; we provide an empirical and open-source basis for making this decision. We based our distributions on actual dietary data, which can allow researchers to estimate population-level nutrient adequacy with greater precision.

Our paper also disaggregates these distributions for different age and sex groups. When we’re forced to rely on nutrient supply data, we often have to make difficult assumptions about how nutrients are distributed among subpopulations. We might misunderstand entirely how inadequacy differs for children, women of reproductive age, seniors, or adolescent boys or girls. These differences might hold helpful information for targeting interventions based on different nutrients for different populations at different stages of life. By providing more detail, we can achieve more accurate and useful results.

My personal favorite contribution of this paper is that all of these distributions are available for you to use in an [R package](https://github.com/cfree14/nutriR) right now. You can look at our code and apply these methods in your next analyses. You can calculate nutrient inadequacy in a population (with the DRI’s already built in!), calculate variance and skewness, compare distributions across populations, shift distributions in response to an intervention, or fit our distributions around the means in your own dataset. It’s also fun to browse the distributions for different countries and nutrients in [this interactive R Shiny web application](https://emlab-ucsb.shinyapps.io/nutriR/).

No method of estimating dietary intake is perfect. We could only estimate with precision the populations for which we had two days of dietary intake data. Many datasets are still not publicly available. And of course, the underlying surveys and food composition tables carry their own challenges. But we do feel that making these methods transparent and accessible will help researchers estimate population-level indicators and impacts with a greater degree of nuance.

There has been a great deal of progress in recent years in developing more precise estimates of what people eat around the world, like the GENuS Database, Global Dietary Database, and Global Nutrient Database. With our new paper, my coauthors and I hope to contribute to this growing body of work—and to support other researchers engaged in this vital field.