

## The authors reply

Os autores respondem

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doi: 10.1590/0102-311X00010422

We want to thank our colleagues for the three excellent commentaries on our manuscript *Education-Related Health Inequities in Noncommunicable Diseases: An Analysis of the Brazilian National Health Survey, 2013 and 2019*<sup>1</sup> to which we would like to contribute some additional thoughts.

One of our main findings reveals that education-based inequities have not changed significantly between 2013 and 2019, despite the declining economic backdrop in Brazil. Faerstein's<sup>2</sup> commentary adds two important points to this discussion: (1) the need to better characterize the burden of chronic conditions across socioeconomic groups, including aspects related to clinical severity and age at diagnosis; and (2) the need to continue to monitor inequities over time, as many chronic conditions have a long latency period and the relationship between health and economic cycles is complex. Faerstein<sup>2</sup> cites studies in which economic recessions in the United States<sup>3</sup> and Europe<sup>4</sup> were not associated with major declines in health. The 2019 *Brazilian National Health Survey* (PNS) data, however, show significant increases in the prevalence of almost all conditions examined. Other data sources also indicate a decline in population health. For example, in 2016, infant and under-five mortality increased for the first time in 25 years<sup>5</sup>. These findings point to a complex scenario with potentially different mechanisms that need to be examined using a combination of data sets including disease prevalence, severity, and mortality to better understand the changing burden of chronic conditions within socioeconomically disadvantaged populations. Moreover, these findings suggest the need to better understand relations between macroeconomic changes and population health, focusing on how government actions (such as Brazil's austerity policies) can improve or exacerbate the effects of economic downturns on health and health inequities in both the short and long term.

Regarding the discussion around policies to combat inequalities, commentators raised several important points. Schmidt & Duncan<sup>6</sup> highlighted the need to move beyond individual risk factors to invest in population-level interventions that rely much less on individual agency. Population-level interventions, such as taxation and reformulation of processed foods, are more effective in reducing salt intake than individual-level interventions, such as nutritional counseling<sup>7</sup>. Comprehensive policies that promote walking and leisure activities are more effective in increasing physical activity levels than medical advice and mass media campaigns, which rely heavily on individual motivation. Latin America has seen a recent growth in population-level interventions to improve physical activity,

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such as the implementation of bicycle lane infrastructure, with positive consequences for mobility, economic opportunity, and physical activity<sup>8</sup>. Studies have also shown considerable heterogeneity in the distribution of bicycle lanes, with disadvantaged communities having less access to this type of infrastructure<sup>9</sup>. Applying an equity lens to these interventions is critical to assess and hopefully correct any unintended consequences related to health inequities.

Azevedo e Silva<sup>10</sup> highlighted the importance of intersectoral policies to address the root causes of health disparities. Brazil has extensive experience in combating poverty via conditional cash transfer programs. In 2003, a patchwork of programs was unified and expanded under the *Bolsa Família* Program (Brazilian Income Transfer Program), which provided a monthly stipend to families living in extreme poverty. The program expanded rapidly, and by 2006 the number of beneficiaries reached 11 million<sup>11</sup>. By 2012, 36 million people were lifted out of poverty, and several studies showed positive effects on the population's health outcomes<sup>12,13</sup>. But despite its success, the program was discontinued in 2021. Although another program has temporarily replaced the original *Bolsa Família* Program, there is great uncertainty concerning its implementation and effectiveness. The end of the *Bolsa Família* Program is the latest in a series of austerity measures initiated in 2016 amid an economic and political crisis that has resulted in deep cuts in social security, education, and health spending. The deterioration of Brazil's successful social inclusion and health programs have most likely affected the health of disadvantaged populations and may have long-term consequences<sup>14</sup>. It is essential that the country reinvests in comprehensive policies to provide economic opportunities and support to the most vulnerable Brazilians.

The authors also discussed the importance of monitoring health inequalities after the COVID-19 pandemic, considering the complex relations between COVID-19 and chronic conditions and the impact of the pandemic on the economy and society as a whole. As Faerstein<sup>2</sup> points out, COVID-19 has helped erase the imaginary dividing line between communicable and noncommunicable disease. People with chronic noncommunicable conditions such as cardiovascular disease, diabetes, and cancer are also at higher risk of developing severe COVID-19 and death. Studies found wide socio-economic and racial inequities in COVID-19 mortality, with mortality rates 80% higher for black individuals (vs. white) and even higher rates among some indigenous populations<sup>15</sup>. These inequities likely reflect a combination of factors like differential exposure among socioeconomic groups, based on occupation and living conditions, and inequities in chronic conditions that increase the likelihood of severe illness. But the impact of this public health crisis on health inequities is yet to be fully understood, particularly as it relates to the consequences of long-term economic distress resulting from the pandemic, the impact of the pandemic on mental health, and the physiological effects of long-term COVID-19 sequelae, especially among sicker and more disadvantaged populations.

In conclusion, there is still much work to be done to improve our understanding of trends in inequities regarding noncommunicable conditions in Brazil. This should include addressing the environment and climate change as factors that are likely to disproportionately affect the most socio-economically disadvantaged communities. There is also much to be done on the policy front. Policies should continue to be examined from an equity perspective to identify those that are most likely to benefit disadvantaged groups. Sustainability of such programs is essential if they are to have a long-term impact. Ultimately, a combination of policies that promote health equity and a reformulated and strengthened commitment to social inclusion and protection will be critical to reducing inequities in health, disease, and opportunity in Brazil.

## Contributors

Both authors participated in the design, data analysis and interpretation, manuscript writing, approval of the version to be published, and agreement to be responsible for all aspects of the work.

## Acknowledgments

The surveys analyzed here were funded by the Secretary of Epidemiological Surveillance, Brazilian Ministry of Health (TED 18/2019).

## Additional informations

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Submitted on 19/Jan/2022

Approved on 04/Feb/2022