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**Enrique Falceto de Barros, Brazil****CLIMATE CHANGE IN BRAZIL:  
IS PRIMARY HEALTH CARE  
PART OF THE SOLUTION?**

There is no treatment without diagnosis.

Hippocrates

Scenario 1: In 2050, one of the worst climatic scenarios predicted by the International Panel on Climate Change (IPCC) becomes a reality. Most of the Amazon rainforest succumbs to deforestation for cattle ranching and to an unparalleled drought. As a consequence, Brazil loses its main engine for rain. The Brazilian north-eastern provinces, always semi-arid, turn to desert, forcing hundreds of thousands of environmental refugees to flee to already overcrowded southern cities.<sup>1</sup> A 0.3 metre rise of the Atlantic Ocean and the intensification of tropical storms causes flooding to become routine throughout this continental country of almost 200 million inhabitants, destabilizing coastal and river towns and their economies. As the mean temperature rises by 2°C, widespread flooding generates four different types of dengue viruses, causing unprecedented dengue haemorrhagic fever epidemics that the Brazilian hospital-based health-care system cannot effectively deal with. Agriculture also affected by intense climatic change and by a lack of technical expertise, suffers a productivity drop that significantly harms one of the main pillars of the Brazilian economy.

Scenario 2: In 2050, one of the most optimistic climatic scenarios predicted by the IPCC prevails. The International Climate Change Mitigation Agenda has been successfully implemented in time, reducing greenhouse gas (GHG) emissions worldwide. In Brazil, agricultural adaptation research investments yield higher productivity. Even Brazil's semi-arid north-eastern provinces, with technical help from Israel and other countries, improve their agricultural output. The Brazilian health system successfully completes its transition to a model based on primary health care (PHC). The 1°C rise in the mean temperature and resulting storms and flooding are a blow to Brazil, but its well-established infrastructure for prevention and response to natural calamities is able to manage these problems.

Unfortunately, scenario 1 is not a creation of science fiction. Global GHG emissions have increased dramatically in the past few years and they appear to be accelerating.<sup>2</sup> Thus, the “worst climatic scenario” presented in the Fourth IPCC Assessment Report actually has a strong likelihood of occurring. Brazil is very vulnerable to climate change; because of its enormous social inequality (one of the worst on the planet); because of the continuing loss of its rainforest, which is crucial for the proper regulation of its micro-climates; because of its precarious health infrastructure; and, because of its political stagnation in the face of the climate change challenge. Nonetheless, scenario 2 is also possible if

Brazil can overcome a few fundamental problems and unites with other countries to markedly reduce GHG emissions.

Brazil is faced with remarkable climate change challenges, including the reduction of its GHG emissions, the protection of the Amazon rainforest, the adaptation and modernization of its agricultural sector and intensification of a transition from a hospital-based health-care model to one based on PHC. As a resident in family and community medicine, I must concentrate my efforts on aspects of the health-care system.

As I write this essay, six colleagues from my residency programme are working on Brazil's health-care response to the 2008 dengue epidemic in Rio de Janeiro, an epidemic that has probably been encouraged by climate change.<sup>3</sup> They have joined a National Medical Mission to reduce the deficiencies of the local health-care system. This haemorrhagic fever outbreak, which is the worst in the history of the country, has already caused 55 confirmed deaths, and much confusion and turmoil in the overwhelmed city hospitals. This epidemic may be seen as an example of things to come as the impacts of climate change increase.

The present crisis in Rio is an illustrative case study. While this city is in a health-care crisis and has incurred alarming numbers of dengue deaths, the neighbouring city of Niteroi – separated from Rio by a 13 km concrete bridge – has a relatively controlled situation, with no confirmed dengue deaths. This contrast between Rio and Niteroi has been intensively discussed, and a national consensus has been reached that the critical difference in health outcomes in the two cities is due to unequal implementation of local PHC. Niteroi covers more than 67% of its population with a PHC approach that encourages systematic mosquito prevention efforts and treats low-risk dengue fever patients as outpatients. In Rio de Janeiro, however, 92% of the population depends on a fragile hospital-based local health-care system. The structural contrasts are marked and the consequent health results are indisputable.<sup>4</sup>

The contrast of Rio and Niteroi teaches us that the implementation of PHC in Brazil is very uneven, and in some places tragically slow. How can we explain, that after a decade of dengue epidemics and Brazilian national funding, Rio is not adequately prepared? As someone fairly well acquainted with the Brazilian PHC model, I feel Rio's difficulties are less the result of a lack of financial support or scientific consensus<sup>5</sup> and more a matter of cultural issues. Therefore, qualitative research (perhaps an anthropological approach) may be needed to elucidate the functioning of the complex cultural interplay involved. This kind of analysis might show the roadblocks and suggest ways to speed the transition to a more equilibrated and successful national PHC system. To my knowledge, there is currently no systematic research in Brazil addressing such matters.

The best way to prepare for the impact of climate change on health is by implementing a widespread PHC system, because PHC providers are the most in touch with local conditions and can adapt most quickly to changing local environmental and health-care needs. I do not know how the PHC system should respond to every need—extreme events, massive waves of environmental refugees, post-traumatic stress and changes in epidemic patterns are not the

daily concerns of PHC providers. But most health effects of climate change will develop gradually, in small steps, and PHC providers will be in the best position to notice these changes and make adjustments to manage them.

With this subject in mind, my colleagues and I are concluding a systematic review<sup>6</sup> to evaluate the possible impacts of climate change on PHC in Brazil, and how PHC providers can prepare and respond to these new challenges. To our surprise, we found only 55 articles in MEDLINE on climate change and PHC, and most of these dealt only with the impact of extreme events. Also, none of these works specifically addressed the Brazilian situation. This kind of research, which aims to understand the possible roles of PHC in lessening the negative consequences of climate change, is of great importance in building a coherent and responsive national health-care system. And it may also accelerate the transition to a dominant PHC model in Brazil, as it demonstrates a central role for this model in Brazilian preparations for the main challenge of the 21st century.

This perspective on the possible strategic functions of PHC may even aid in the formulation of broader policies to mitigate climate change. For instance, when we formulate policies for primary prevention of cardiovascular diseases it may be possible to include the need to diminish our dependency on automobiles (directly reducing carbon dioxide emissions and stimulating exercise) and to diminish our consumption of red meat (reducing cattle ranching deforestation, reducing methane emissions and promoting healthier diets).

Hopefully in the end, the Rio/Niteroi case will be less a sad portrait of a country in crisis and more a strong stimulus for the continuous refinement of better health policies in Brazil, and (why not?) in the world. Despite the eminent chemist Arrhenius's predicted connection between GHG emissions and global warming at the turn of the 20th century and the current scientific explosion of evidence of global warming itself, there are still few papers dedicated to the development of practical strategies for the health sector to mitigate the negative health effects of climate change. I think the widespread implementation of a PHC model will be a necessary cornerstone for such efforts, and research specifically focused on developing PHC strategies will be needed for an optimal response.

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- 1 Malhi Y et al. Climate change, deforestation and the fate of the Amazon. *Science*, 2008, 319(5860):169–172.
  - 2 *Climate change 2007: synthesis report. An assessment of the Intergovernmental Panel on Climate Change*. IPCC, Geneva, ([http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf), accessed 27 April 2008).
  - 3 Barclay E. Is climate change affecting dengue in the Americas? *Lancet*, 2008, 22;371 (9617):973–974.
  - 4 Cunha CRH. Não se reduz mortalidade sem intervenção. *Zero Hora* (<http://zerohora.clicrbs.com.br/zerohora/jsp/default2.jsp?uf=1&local=1&source=a1838961.xml&template=3898.dwt&edition=9728&section=101>, accessed 27 April 2008).
  - 5 Starfield B. *Atenção primária: equilíbrio entre necessidades de saúde, serviços e tecnologia*. Brazil, UNESCO, Ministério da Saúde, 2002.
  - 6 Barros E, Schwalm FD, Castro Filho, eds. Climate change impact on primary health care: a protocol for a systematic review. In: *Annals of the 9th Brazilian Congress of Family and Community Medicine*, 2008 (in press).

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Enrique Falceto de Barros pursued an Environmental Studies major in the United States at Bowdoin College, in Brunswick, Maine. In 2007, he received a medical degree from Universidade Federal do Rio Grande do Sul, Brazil, where he participated in student politics for primary health-care reform, and also dedicated time to semiology tutoring and clinical research. Enrique co-authored two international papers and had a letter published in *The Lancet*. In 2008, Enrique started residency in Family and Community Medicine at the Grupo Hospitalar Conceição. In May, he volunteered as a physician to help fight the dengue epidemic in Rio de Janeiro. Enrique shared a Brazilian national award in June for the paper “Climate change impact on primary health care: protocol for a systematic revision”. He aims to help integrate environmental perspectives into Brazilian primary health care.