

LEVERAGING PARTNERSHIP IN THE CUBAN NATIONAL HEALTH SYSTEM TO PROTECT PEOPLE FROM THE HEALTH HARMS OF CLIMATE CHANGE

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Abstract

In Cuba and elsewhere, climate change is harming human health in myriad ways. This article reviews the climate change-related health risks faced by people in tropical small-island developing nations throughout the Caribbean. It provides an overview of Cuba's partnership- and solidarity-oriented National Health System (*Sistema Nacional de Salud de Cuba*, or *SNS*), which, despite severe financial and material limitations, maintains a strong focus on universal coverage, primary care, and disease prevention. This highly effective and efficient system can be further leveraged to prevent harms to people's health from climate change. As an example, we focus on chronic kidney disease and describe current efforts and future potential for leveraging the partnership-based Cuban model to address this climate change-related health threat. We conclude by examining how the Cuban model could be harnessed in other nations to effectively mitigate and adapt to the human health impacts of climate change.

Keywords: Climate Change, Partnership, Solidarity, Chronic Kidney Disease

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Introduction

According to the *Lancet* Countdown, "Climate change is the greatest global health threat facing the world in the 21st century, but it is also the greatest opportunity to

redefine the social and environmental determinants of health” (The Lancet, n.d., Tracking Progress. The science is unequivocal. Climate change is causing profound human health harm, in the Caribbean and beyond. The health chapter fact sheet of the Intergovernmental Panel on Climate Change’s (IPCC) Sixth Assessment Report (2023) concluded with very high confidence that “climate-related illnesses, premature deaths, malnutrition in all its forms, and threats to mental health and well-being are increasing” and that “cascading and compounding risks affecting health due to extreme weather events have been observed in all inhabited regions, and risks are expected to increase with further warming” (IPCC, 2023, Impacts and Risks).

Many health systems worldwide may be ill-prepared to mitigate and adapt to climate threats and may lack the communication processes to inform people and communities about emerging and urgent threats rapidly. Community engagement provides an entry point for contributing to social capital and resilience at the individual and community level. Strengthening primary health care and health system governance structures and increasing multisectoral coordination and collaboration with a specific focus on the local context will enable greater adaptability to address emerging challenges (Lugten & Hariharan, 2022).

The highly effective partnership-based primary health system in Cuba, a country of about 11 million people in the Caribbean, can serve as a model for other nations trying to respond to the health threats of climate change.

Climate Change Impacts in Cuba

In 2023 the Caribbean chapter of the Fifth US National Climate Assessment concluded with high confidence that:

As extreme weather events become more intense and more frequent, residents will continue experiencing increasing levels of noncommunicable diseases, excess mortality, behavioral health challenges, and loss of quality of life. The frequency of heat episodes and hurricanes' severity are expected to increase in

the region due to human-induced climate change, which will affect public health unless adaptation measures are taken (Méndez-Lazaro et al., 2023, Key Message 1).

In Cuba, the health effects of climate change include increases in the seasonal distribution of some communicable and vector-borne diseases, including acute respiratory infections, chickenpox, hepatitis A, diarrheal diseases caused by bacterial enteropathogens (*Salmonella* and *Escherichia coli*), parasitic and viral diseases, and dengue (Ortiz Bultó et al., 2022a). There is also evidence of increases in other water-, air-, soil- and food-borne illnesses (Ortiz Bultó et al., 2022b; Ortiz Bultó et al., 2015) and chronic non-communicable diseases, including cardiovascular and cerebrovascular mortality, and in particular, acute myocardial infarction and stroke (Rivero et al., 2015; Rodríguez Díaz et al., 2015; Romero, 2017).

Rising temperatures and concomitant dehydration associated with climate change are causing rising rates of, and hospitalizations for, kidney disease in the tropics and other temperate regions, especially among people with prolonged exposure to the heat, such as outdoor workers (Bharati et al., 2022). Women, children, older people, Indigenous community members, and people with pre-existing kidney disease are also particularly vulnerable. In Cuba, agriculture is the largest employment sector, which exposes large portions of the population to increasingly extreme heat conditions. In addition, some other sectors' workers such as roofers, gardeners, and construction workers must do labor under sunny environments.

Like other nations, climate injustice and heat-related health impacts are deeply intertwined with pre-existing social, economic, and geographic disparities. Cuba's model of partnership or solidarity is rooted in a commitment to structural vulnerable populations. In partnership cultures, the economic model and social structures are democratic, with hierarchies of actualization that empower rather than disempower (Center for Partnership Systems, 2025). These hierarchies of actualization can be seen embedded in the economic model and social structures of Cuba. Harmon and Kirk (2021)

describe three aspects of Cuban solidarity: social, civic, and political. In each of these, people have a moral obligation to put the needs of the collective before the needs of the individual. This cultural orientation acknowledges the importance of bolstering the response to the unequal impacts of climate: for example, rural and remote areas that lack access to food and water during climatic impacts, and urban areas where many people live in low-income communities and are more susceptible to temperature increases and extreme heat, exacerbated by the urban built environment. Efforts to address climate disparities include strengthening health-care accessibility, improving infrastructure in rural and urban communities, and fostering resilience at the local level. Accessibility and resilience are hallmarks of the Cuban health system.

Overview of the Cuban Health System

Cuba's primary care-focused National Health System (NHS) or *Sistema Nacional de Salud de Cuba* (SNS) offers universal health coverage regardless of skin color, creed, geographic location, or economic, social, or political standing (Domínguez Alonso & Zacca Peña, 2011). With the aim of sustainability, the system simultaneously strives to improve the population's health, the quality of medical care delivered, people's satisfaction with services, and efficient use of resources (Gálvez González et al., 2018).

Despite profound financial and material limitations, Cuba's primary health indicators steadily improved between 1959 and 2020, eventually leading the Caribbean region in health outcomes (Pan American Health Organization [PAHO], 2024). However, the current severe economic and financial crisis has led to insufficient coverage of essential medicines and supplies, technological deterioration for providing services, and an exodus of medical science personnel. Even in the midst of these challenges, Cuba has maintained its strong focus on health promotion and disease prevention, strengthening the social determinants of health model, creating opportunities to refine intersectoral work, and encouraging communities to participate in how their health services are delivered (PAHO, 2019). Cuba's approach is aligned with the PAHO's goal of achieving health for all in the 21st century (PAHO, 2014). The Cuban model is also rooted in deep

cultural values including solidarity, equity, and the human right to health (Etienne, 2018). The following is a description of the elements of the Cuban health system.

The Family Medicine Model

Basic Health Teams (*Equipo Básico de Salud*), composed of a doctor and a nurse who work as a pair in a Family Medical Office (*Consultorio del Médico de la Familia*), form the cornerstone of Cuba's primary care model, known as the Family Medicine Model. Each Basic Health Team provides comprehensive medical care to a fixed number of people and their families (currently approximately 700 people). These teams provide care to every person close to where they live or work. This ensures that the same medical or nursing care is offered in the doctor's office or in the person's own home. The Basic Health Care Teams can also accompany patients to the hospital or for an examination; they can visit them during their stay; and they can speak directly with a specialist when necessary.

Each Basic Health Team is embedded in a broader inter-professional network called a Basic Work Group (*Grupo Básico de Trabajo*) that includes specialists in internal medicine, obstetrics and gynecology, pediatrics, and psychology, and a nursing supervisor, as well as personnel with basic training in statistics, hygiene and epidemiology, and social work. A polyclinic, one of 451 regional health-care centers, coordinates health care, teaching, research, and administrative activities for the Basic Health Teams and the Basic Work Groups. The Basic Work Groups constitute the population's first contact with basic specialties. These groups are held in the polyclinic's own office in the community and remain accessible to all. They provide a second opinion or confirmation of the family doctor's diagnosis, and they also intervene in the dynamics of preventive, curative, or rehabilitative care for families, which are carried out in a planned manner and in conjunction with the family doctor in the doctor's office.

Cuba's Family Medicine Model aims to improve the population's health status through comprehensive actions at the individual, family, and community levels, and preventive

actions in the surrounding physical environment (Herrera Alcázar et al., 2014). Strategies for achieving these aims include:

- promoting health knowledge, attitudes, and healthy behaviors in the population, with an emphasis on the active participation of the community and inclusion of all sectors;
- enhancing the social integration of people, families, and the community; preventing population health risks;
- conducting health programs in specific settings including schools, workplaces, and vulnerable neighborhoods;
- ensuring early diagnosis of disease and medical care through the integration of clinical, epidemiological, and social methods;
- offering community-based rehabilitation for people with disabilities;
- training health professionals with scientific and technical knowledge and skills grounded in an ethical-humanistic philosophy of health; and
- prioritizing research to address the problems identified in the analysis of the health situation of the community. (Ministry of Public Health (CUBA) Department of Primary Health Care, 2023)

Every community has input into and participates in these strategies. Unlike health systems based on domination, where health providers direct patients and order behavior changes and treatments with little involvement of the patient or family, the Cuban system deeply orients toward partnership, mutual respect, and open communication between the provider, patient, and family. Cuban physicians sit on a chair at the same table and at the same level as the patient and listen to the patient or family's primary concerns. They do not stare at a computer as they ask questions, and there is not a sense of urgency or the need for a rushed visit even though the waiting room may be full. The patient and family have the full attention of the physician, and both the physician and the patient have input into the treatment plan (T. Potter, personal communication, March 15, 2025).

Assessing Risk and Providing Primary Care

The Cuban Family Medicine Model actively assesses the health risks and needs of every person, family, and community to ensure each gets the appropriate level and type of care. A family health history is taken to assess individual and family risks and needs, and a “dispensary group” score is given to every person assigned to a Family Medical Office. A person’s dispensary group score (see Table 1) determines the minimum frequency at which their Basic Health Team must see them. The score is determined based on current health status and risks, stratified by age and sex, considering their family’s health functioning.

Table 1. *Categories of Dispensary Groups*

Group	Population	Minimum number of times seen per year
I	Apparently healthy people	1 time/year in clinic
II	People at risk	2 times/year (1 in clinic and 1 in field)
III	People with a disease diagnosis including: Tracer diseases: high blood pressure, cardiovascular and cerebrovascular diseases, cancer, bronchial asthma, smoking, chronic obstructive pulmonary disease, diabetes mellitus, chronic renal failure, liver disease, dyslipidemia and obesity; and Non-tracer diseases: All other infectious diseases.	Tracer diseases: 3 times/year (2 in clinic and 1 in field) Non-tracer diseases: 2 times/year (1 in clinic and 1 in field)
IV	People with disabilities according to type and without any other associated pathology	2 times/year (in clinic or in field)

Source: Ministry of Public Health, 2023

In turn, a family’s health functioning is based on four considerations: 1) structure and composition of the family (nuclear or extended); 2) material living conditions (income, housing, household equipment, overcrowding); 3) health of family members (risks, serious illness, disabilities); and 4) family functioning (an evaluation of the basic functions and interpersonal dynamics of the family). These considerations are used to classify families as either having or not having family health problems. This designation influences the frequency of contact with their Basic Health Team. Thus, the family is a focus of treatment in addition to every individual.

Members of the Basic Work Group also conduct an annual health assessment of every community assigned to them to identify each community's main health problems. This assessment drives the selection of community-focused health enhancement strategies with input from, and involvement of, community members and local government officials (Martínez Calvo, 2013; Quintero et al., 2017). This aspect of the Family Medicine Model can be leveraged to address the unique needs of frontline communities living near coasts, in flood-prone areas, or more likely to experience severe weather events as hurricanes.

Home admission, another fundamental activity of the Cuban Family Medicine Model, is the comprehensive, integrated, and continuous care provided by the Basic Health Team to patients at home when their condition requires isolation or bed rest, but not complex care or hospitalization (Ministry of Public Health, 2023). It helps ensure good clinical and population health outcomes, promotes family and community responsibility in the care process, and creates economic efficiency in the health system. To qualify, the patient and family must be willing and able to provide care and compliance with medical instructions, including the acquisition of medicines, food, and supplies, and maintain hygienic conditions. Patients who do not meet the above requirements or whose condition requires admission to a hospital unit are transferred to that unit, ensuring accessibility, free treatment, and continuity of care. The family doctor maintains communication and a liaison with the hospital physician for the patient's follow-up, progress, and discharge.

A Focus on Disease Prevention and Health Promotion

A focus on disease prevention and health promotion is emphasized in all aspects of the Cuban Family Medicine Model. It cuts across all levels of the NHS, including the Basic Health Teams, Basic Work Groups, polyclinics, and hospitals, and this focus guides their collaborative planning with community members, local governments, and local political party leaders. It also influences health professionals' learning. Instead of prioritizing high-cost complex care, health professionals are educated to prioritize primary care to prevent the need, when possible, for acute and chronic care.

The Family Medicine Model has been constantly evolving to meet new challenges in improving the health status of the Cuban population. Its four central elements in this evolution have been primary care focused on prevention and health promotion with an epidemiological approach; ensuring continuity of care; community participation; and intersectoral priority setting. Values such as humanism and solidarity have always characterized the model (González Cárdenas et al., 2018).

Climate Change, Kidney Disease, and Cuba's Family Medicine Model

Climate change amplifies everyone's health risks, but people in dispensary groups II-IV are more vulnerable (see Table 1). This is especially true for kidney disease. Globally, there is a growing number of cases of chronic kidney disease (CKD) linked to prolonged heat exposure and dehydration (Glaser et al., 2016). "Heat stress nephropathy may represent one of the first epidemics due to global warming. Government, industry, and health policymakers in the impacted regions should place greater emphasis on occupational and community interventions" (Glaser et al., 2016, p. 1472).

Preventing and limiting recurrent heat stress is essential for preventing and managing kidney disease. A range of best practices for climate adaptation that can be deployed include:

- cooling practices: a combination of indoor (e.g., air conditioning when feasible, use of available windows) and outdoor engineering (e.g., planting shade trees and other green features);
- administrative practices: rules to limit exposure during times of peak heat and use of personal protective equipment;
- work restructuring: monitoring ambient temperatures (at work sites, school yards, athletic facilities, and buildings and neighborhoods prone to urban heat island effects) and modifying schedules (at worksites and outdoor activity areas) as necessary to reduce heat exposure (especially when people are not acclimatized to the heat);

- acute treatments: providing people who are exposed to dangerous levels of heat with water, electrolytes, and rest breaks in cool, shaded areas. Provide regular education and reminders about these necessary behavior changes for routinely exposed people (e.g., workers, athletes, students);
- education: increasing awareness and appropriate actions by supervisors and health professionals on the signs and symptoms of heat illness, including acute and chronic kidney injury; and
- personal protective equipment: deploying personal cooling devices. (Butler-Dawson et al., 2019).

In a small pilot study, Chicas et al. (2021) found that inexpensive bandanas worn around the neck may be an effective strategy to cool the core body temperature of farm workers, thus decreasing the health risks of heat stroke.

Two fundamental activities of the Cuban Family Medicine Model create significant opportunities to prevent, limit, and control kidney disease: the dispensary group care process can identify at-risk individuals, administer prevention counseling, and diagnose and treat people from the very early stages of the disease. This process is carried out by the Basic Health Team. Meanwhile, the home admission process can provide more extensive opportunities to promote risk factor reduction through behavior modification, and, for people with kidney disease, through enhanced monitoring and treatment modifications, as necessary.

In a general sense, the Cuban Family Medical Mode provides the tools to monitor the increasing risks of kidney disease as temperatures continue to rise. Although the model does not currently have a specific protocol to address the CKD issue, the activities to prevent risks, diseases, and other population health harms are routinely carried out by the family doctor and nurse, the Basic Work Group, and polyclinic personnel.

The model emphasizes the implementation of comprehensive health actions in unique environments, with emphasis on schools and workplaces, as well as on ensuring quality

early diagnosis and comprehensive and dispensary medical care. Specifically, active screening by the family doctor and nurse for risk and various conditions is implemented for such conditions, many of which are interrelated, as high blood pressure, cardiovascular and cerebrovascular diseases, diabetes mellitus, dyslipidemia, obesity, and chronic kidney failure.

Health personnel also pay attention to the various ways that climate change may indirectly harm people's health. Assessment includes medication efficacy, and the rational use and risks associated with the use of pesticides and other highly nephrotoxic agrochemicals that could lead to CKD in special populations, such as agricultural workers (Orantes et al., 2014; Ordunez et al., 2018).

Many factors inherent in the Cuban health system contribute to the resilience of their population:

- extensive investment in human resources;
- health workers who are rigorously trained with both scientific-technical skills and an ethical-humanist approach to their application;
- a clear mandate to prioritize prevention and health promotion with every person, family, and community, in relationship to their surrounding environment; and
- a mandate to interact with community leaders and governmental and nongovernmental institutions to establish community priorities and community-based prevention and health promotion programming (E. Maibach, personal communication, March 15, 2025).

All these social assets create exceptional opportunities to educate the Cuban people about new and emerging health risks from climate change, and to help them manage those risks as effectively as possible. In short, Cuba's human-centric approach to health and health care is precisely the asset that lends itself so effectively to addressing the emerging health risks associated with climate change.

Strategies for Health Education and Communication and Behavior Change

In Cuba, as is the case everywhere, motivating and helping people change their health behavior or any behavior is challenging (Sheeran & Webb, 2016). One approach for managing climate risk behavior emerging elsewhere in North America is particularly well-aligned for application in Cuba. This approach treats the challenges of motivating people, individually or collectively, to change their behavior, and helping motivated people (again, individually or collectively) succeed in changing their behavior, as interrelated but distinct challenges (Maibach et al., 2023). The claim by proponents of this approach is that treating the two elements of this challenge separately—i.e., creating motivation for change and enabling people to effect the change—is likely to produce better outcomes than approaches that assume motivated people will effect change that aligns with their motivations (Maibach et al., 2023). To that end, Maibach et al. (2023) proposed two distinct sets of evidence-based guidelines, one for education and communication (to teach people about their risks, enable them to make good decisions, and motivate them to act on their choices), and one for behavior change to help people succeed in acting on their choices. Both guidelines, aligned with the principles of community-based social marketing (McKenzie-Mohr, 2011), are relevant to preventing and limiting kidney disease among people working in heat-stressed environments. Both guidelines are based on partnership principles of mutual respect and empowerment.

Best Practices in Climate Communication

The evidence-based guideline for effective health education and communication is simple clear messages, repeated often, by a variety of trusted and caring messengers (Myers et al., 2015). Applying this approach can help ensure that people have the information they need to understand their risk related to climate change and what can be done to reduce it, which, at a minimum, will enable them to make an informed decision about the course of action they feel is best for them. It may also increase their motivation to take that course of action. In turn, the proposed guideline for helping people change their behavior—assuming they want to change their behavior—is to make

the behavior easy, fun, and popular (Maibach et al., 2023). These guidelines are explained in further detail below.

Simple, Clear Messages Repeated Often by a Variety of Trusted, Caring Messengers.

Information complexity is a challenge for education and communication; the more complex the information is, the less likely most people are to engage in the mental effort necessary to understand it. Appropriately simplifying complex information into simple and clear statements, which is best done through research to understand people's current mental models and identify what new information will help them reach a better understanding of the situation, is the most reliable way to help people reach an appropriate conclusion and motivate them to learn more, and thereby better understand the complexity of the issue. Message repetition, in turn, is essential to learning; the more people hear information, the more likely they are to comprehend it, accept it, and incorporate it into their thinking. Each repetition increases the odds of learning and lasting impact. Finally, trust in the information messengers, and seeing them as caring, is essential to learning; when people have limited or no trust in messengers, they are likely to reject the messages. Community members themselves are often the most highly trusted messengers (Maibach et al., 2023).

The Cuban model of prevention-oriented primary care provides multiple opportunities to educate all Cubans about the health risks associated with climate change. The following table lists communication best practices for those at elevated risk for kidney disease—about their risks and what they can do to reduce their risks (for example, adequate hydration, rest breaks out of the sun, and the use of cooling bandanas). As shown in Table 2, this occurs in their routine preventive primary care visits with members of the Basic Health Team (and, if necessary, with members of the polyclinic team) and in various community settings, including community meetings, work, and school.

Table 2. *Educating Cubans about Chronic Kidney Disease and How to Prevent It*

Evidence-based communication element	Examples from Cuba
Simple, clear messages	<p>Messages conveyed:</p> <ul style="list-style-type: none"> ● Hotter weather caused by global warming is placing stress on people’s bodies, which can cause heat stroke and eventually lead to CKD. ● People, especially outdoor workers, can help protect themselves by drinking lots of water and other liquids, taking rest breaks in a shaded area, and wearing a cooling bandana. ● Supervisors at work and at school should adjust schedules to limit people’s exposure to extreme heat and remind people to stay hydrated and take rests.
Repeated often	<p>When messages are conveyed:</p> <ul style="list-style-type: none"> ● During prevention-oriented and relevant treatment-oriented clinical interactions ● During community meetings ● At work and school ● Public service announcements on TV
Trusted and caring messengers	<p>By whom messages are conveyed:</p> <ul style="list-style-type: none"> ● Basic Health Team members and other health workers ● Local community leaders ● Work supervisors and teachers

Making Healthy Behavior Easy, Fun, and Popular

The gap between people’s intentions (which generally favor being healthy) and their actions (which often fall short of optimal) is known as the intention-behavior gap. This gap is well-documented across a wide range of health, sustainability, and other behavioral domains (Sheeran & Webb, 2016).

To reduce the intention-behavior gap, it is helpful to focus on behavior itself—rather than on people who are already motivated to perform the behavior—by making the behavior easier to perform (easy), more likely to provide benefits that people value (fun), and more likely to be seen as socially normative (popular) (Maibach et al., 2023). Making behaviors easier involves identifying and removing barriers that make the behavior hard for people to perform; modeling the behavior so that people better

understand how to perform it; increasing people's sense of self-efficacy (and collective efficacy in the case of collective action); and encouraging people to set incrementally larger goals that move them toward behavioral mastery over time. Making behaviors more fun—more likely to deliver benefits that people value—involves providing people with positive reinforcement for taking the action and acknowledging their progress toward their goal. Making behaviors more popular is done differently, depending on how popular the behavior currently is, or isn't: when few members of the population are performing the behavior, it is helpful to elevate 'positive deviants' (people who are achieving positive results given the same set of resources, when others are not) as role models; the next step is to identify and activate peer opinion leaders (who, in turn, will influence others in their social network); and finally, as a new social norm begins to develop (dynamic norms), and become more common (descriptive norms) and increasingly approved of (injunctive norms), then efforts to communicate the changing social norms will produce a social 'pull' such that more people will start performing the behavior.

The Cuban model of prevention-oriented primary care provides opportunities to make behaviors that help prevent kidney disease (for example, adequate hydration, rest breaks, and cooling bandanas) easy, fun, and popular. For example, the relationship-based health care model where every person has access to a trusted local provider, promotes early and regular consultation to address heat stress and dehydration. Community involvement at the neighborhood level has the benefit of normalizing protective behaviors and creating a sense of solidarity around protecting the most vulnerable. Lastly, the Basic Work Team teaches patients about the risks of dehydration and the importance of adequate fluid intake.

This paper has used kidney disease to exemplify how the Cuban health system effectively informs and inspires health promotion and disease prevention. The Caribbean country's health system is well-positioned to respond to other climate threats such as vector-borne illnesses, respiratory impairment from wildfire smoke or air pollution, food or water scarcity, and more severe tropical storms and hurricanes.

Finally, the Cuban model's strong orientation toward partnership and solidarity can also help ameliorate climate anxiety and despair and promote psychological resilience.

Conclusion

The approach detailed in this paper can be used over time to introduce a range of climate/health resilience behaviors sequentially at a low cost and in a manner that encourages broad cultural embrace and implementation of the actions. Through its comprehensive primary care and prevention focus on the individual, family, and community, and through its preventive actions in the surrounding physical environment, the Cuban model of health care is well-positioned to help protect the health of Cubans and to become more resilient to the health threats of climate change that will continue to manifest in the years to come. The Cuban partnership approach, which plans and implements strategies in collaboration with communities, state and municipal entities, and local governments, offers hope for scaling up adaptation and mitigation strategies, advancing environmental sustainability, and ensuring the quality of life, well-being, and health of present and future generations.

This is a model that other low- and middle-income nations, and even high-income nations, may wish to consider and emulate. Indeed, given Cuba's focus on solidarity with other nations with unmet health needs, the Cuban government may be willing to train health personnel in other nations on how to implement this health system model to prepare and protect their people in this era of climate change.

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