

## On the Biopsychosocial Model: The Example of Political Economic Causes of Diabetes in the Marshall Islands

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*Biomedical reductionism, the unwritten theory underlying the practice of medicine, is being supplanted by the biopsychosocial model. The explanatory power of the biopsychosocial model, however, is hampered by an inadequate mechanism to account for the social production of disease. We examine diabetes in the Marshall Islands to explore a conceptual approach that incorporates ecology, history, and political economy into the biopsychosocial model. The use of the Marshall Islands by the United States as testing grounds for nuclear war has led to ecological destruction, population displacement, and economic dependency. The consequence at the biological level has been an epidemic of weight gain, altered metabolism, and diabetes. A political economic perspective reveals that such outcomes are the result of decisions made by those who do not live with these decisions. Such a perspective points the way for social engagement and political work toward justice and health.*

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While most health practitioners view their work as scientific and commonsensical, all of us have theories about the world and how it works, ideas that necessarily influence our efforts and perceptions in health and health care. Although the dominant medical paradigm remains biological reductionism, a number of alternative theoretical approaches have been introduced.<sup>1</sup>

One alternative to the biomedical paradigm, the biopsychosocial model, was proposed by Engel over two decades ago.<sup>2</sup> McWhinney has suggested that we are in the midst of a paradigm shift, as the anomalies of the biomedical model lead to it being supplanted by the biopsychosocial model.<sup>3</sup> Recently, we have seen a number of attempts to modify the biopsychosocial model and find the most promising modification to be that suggested by Farmer,<sup>4</sup> discussed below.

In this paper, we applied some of the insights of Farmer and others in an attempt to clarify some conceptual issues relevant to the biopsychosocial model. To illustrate this, we used as an example the problem

of diabetes in the Marshall Islands, a site where we practice medicine and public health. We examined questions like: How should a problem like diabetes in the Marshall Islands be understood? How can it be addressed? If we use the biopsychosocial paradigm, how does it help our understanding? What is meant by “psychosocial” in biopsychosocial? Can the biopsychosocial model take account of large-scale social phenomena?

We begin with some background.

### **The Marshall Islands—A Strategic Trust**

After the Second World War, the United States administered Micronesia as a trust territory. From 1946 to 1957, the United States tested nuclear weapons in the Marshall Islands, including its largest test, the 15-megaton Bravo blast. This testing resulted in the displacement of people, radioactive contamination of islands, and direct fallout on Marshallese people.

The US Army Kwajalein Atoll/Kwajalein Missile Range (USAKA/KMR), a military base, is housed on Kwajalein Atoll of the Marshall Islands. USAKA/KMR is equipped to track ballistic missiles launched from California. Kwajalein Atoll is also the launch site for the interceptors being tested for the proposed ballistic missile defense system. Depending on the level of

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activity, 2,000 to 4,000 people who are not Marshallese live on Kwajalein Island, the largest island in Kwajalein Atoll. The US Army is in charge, and most of the residents are employees of private US contractors. These residents have restaurants, tennis courts, a golf course, swimming pools, free movies, and fresh fruits and vegetables at the supermarkets.

The Marshallese who work on Kwajalein Island (largely performing labor such as cooking and cleaning) live on nearby Ebeye Island, a 20-minute ferry ride away. They arrive on Kwajalein Island in the morning and must return to Ebeye when they complete their shifts. Jobs at the military base have led to a burgeoning population on Ebeye. Ebeye Island is stark, with few trees and few open spaces. Its 66 acres are home to 10,000 people. The houses are crowded; many are made of corrugated tin and plywood. The people of Ebeye struggle to supply themselves with fresh water. Rain catchment facilities are insufficient, and operation of a desalinization plant has been unsustainable. Drinking water is supplemented by children, who carry water in buckets via the ferry from Kwajalein Island to Ebeye.

Poor sanitation and the lack of clean water on Ebeye were underscored by a cholera outbreak in December 2000. As of this writing (January 2001), there were 331 cases and 6 deaths. In contrast, no cases have occurred thus far on Kwajalein Island, which is well-equipped for water and sanitation.

While the traditional staple foods in the Marshall Islands were taro and breadfruit, imported white rice is now the basic starch. Displacement from home atolls has meant that agriculture and gathering of reef resources have been abandoned in favor of a commodity economy based on processed foods and canned goods. No agriculture is possible on Ebeye, making its residents completely dependent on outside food shipments.

The poor nutritional value of the food supply has led to undernutrition in children and high rates of obesity in adults.<sup>5</sup> Vitamin A deficiency is highly prevalent in children.<sup>6</sup> Diabetes is the No. 1 health problem in Ebeye. A study in 1989 found that more than half of the people over age 50 in the republic had diabetes.<sup>7</sup> Our review of outpatient medical records in Ebeye revealed a prevalence of diabetes of 20% in patients age 30 or older and 46% in patients age 50 or older (unpublished data).

The people lead more sedentary lives than in the past, and their communities have become fragmented. Many extended families have separated, and cultural norms regarding the care of children have been lost.

### **The Biopsychosocial Paradigm: Does It Help Our Understanding of the Problem of Diabetes in the Marshall Islands?**

Engel's<sup>2</sup> most important contribution was the recognition that perturbations occurring at any level in the hierarchical biopsychosocial system exert effects on other levels. In Engel's schema, the upper reaches of the hierarchy consist of culture, the nation state, and the ecosystem. Applying such a schema to the Marshall Islands, perturbations at these levels (ecological destruction, population displacement, economic dependence) lead to consequences at the biological level (weight gain, altered metabolism, and diabetes). In this manner, the biopsychosocial schema can thus account for the social production of disease.

McWhinney<sup>3</sup> advanced the model to include a more explicit biological mechanism by which psychosocial phenomena can influence bodily states. For example, stress reactions affect the functioning of the immune system, leading to disease. Thus, the mechanism by which perturbations at the psychological level exert their effects at the biological level is explicated.

The historical experience of the Marshallese includes colonization, precipitate modernization, erosion of their traditional culture, and having their islands subjected to the violence of nuclear explosions. The associated chronic psychological stress can be expected to contribute to illness among the Marshallese. Psychological mediation through stress is not the only mechanism by which diabetes occurs. Rather, the material conditions of life are the primary determinants of diabetes in the Marshallese.<sup>9</sup> Ultimate causes, thus, are large-scale social phenomena.

### **Large-scale Phenomena and Human Agency**

In their examination of the theoretical foundation of family medicine, Rabinowitz et al view the environmental threats to the patient's health as social facts to be discovered and addressed.<sup>10</sup> Similarly, while Rosenblatt has expanded the terms of the discussion to global issues, his perspective does not clearly identify the political economic imperatives that lead to environmental degradation and poor health.<sup>11</sup> Neither Rabinowitz et al nor Rosenblatt delineate the social production of disease or identify the human agency that leads to environmental threats. They do not identify political struggle as being necessary to remove the threats.

Rosenblatt et al identify the sociobehavioral pathology of violence as one of the current generation of diseases. Nothing could match the violence, however, of nuclear war. The testing of weapons for nuclear war has wreaked violence on the bodies and islands of the Marshallese. This may be seen as reflective of institutionalized inequality: a differential in power between the Marshallese and those who decide to test the weapons.

### A Biosocial Approach

In *Infections and Inequalities*, Farmer terms his approach toward HIV in Haiti a biosocial one.<sup>12</sup> Drawing on fields as diverse as molecular biology and world systems theory, he explicates the epidemiology of HIV in Haiti, linking it to the history of Haiti from its colonial history to the consequences of “development” aid.<sup>4</sup> The macro level is thus demonstrated to have profound influences on the micro level, and the mechanisms by which the social production of disease occurs is delineated. We seek here to perform a similar analysis for diabetes in the Marshall Islands.

### A Dialogue

Drawing on Farmer’s approach, accounting for large-scale, historical, political economic forces in our formulation, let us construct a dialogue. We suggest that such a dialogue would be of utility in education in Freire’s sense, education for popular mobilization.<sup>13</sup>

Why is diabetes so prevalent in Ebeye? Because the present lifestyles are sedentary. Because people eat foods of poor nutritional value. So, lots of people are overweight.

Why do they eat such food? Because that is what is affordable and available as imports from the United States. Because the people have developed a taste for processed foods and no longer have access to local foods.

Why don’t they eat their traditional foods? Because agriculture is not possible on Ebeye. Much of the traditional knowledge about cultivation and fishing has been lost.

Why didn’t they stay on their own islands? Because education and cosmopolitan culture are lacking there. Because they were displaced from their islands. And, because Kwajalein is one of the few places where there is work.

Why were they removed from their islands? To test nuclear weapons and missile systems.

Why does the United States have nuclear weapons? Because it desires to maintain strategic military dominance. What we say goes.

Why does the United States need to do that? Because it wants to protect its interests and wealth.

### How Can We Address Diabetes in the Marshall Islands?

By taking the problem of diabetes through a more socially informed biopsychosocial model, it becomes evident that in Ebeye, diabetes is not simply a meta-

bolic problem of elevated serum glucose. Our examination reveals the manner in which diabetes in Ebeye is socially produced—that at its roots are economic interests, cultural disruption, and ecologic destruction.

We need to investigate further the large-scale social, political, economic, and ecologic aspects of this and other health problems. An understanding of the social realities should spur us to work to address the antecedent causes. We write these words recognizing they are an act of health promotion via political engagement.

Those of us with the wherewithal should act on our ability to influence the state of the world. As moral actors, it is our ethical duty to do so.

**In Ebeye, diabetes is not simply a metabolic problem of elevated serum glucose. Our examination reveals the manner in which diabetes in Ebeye is socially produced—that at its roots are economic interests, cultural disruption, and ecologic destruction.**

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