# The Worldwide Rise of Chronic Diseases and Potential Nutritional Solutions



**The majority of deaths today, worldwide, are due to chronic, non-communicable diseases**

60% of deaths in the world are due to chronic diseases comprising heart diseases, cancers, stroke, diabetes, and chronic respiratory diseases. The World Health Organization expects chronic diseases to rise to epidemic proportions by around 2025. Already, 80% of chronic diseases are in lower & middle-income countries where age-adjusted death rates from cardiovascular diseases are continuing to increase, and impacting younger age groups. Yet, chronic diseases are relatively neglected by national and international agencies and they do not feature in the Millennium Development Goals, or the priorities of major foundations like the Gates Foundation. Tobacco control may be an exception to that neglect, in certain instances.

Infectious diseases, currently the major focus of multilateral agencies and foundations, cause about 30% of worldwide deaths and will continue to decline. Demographic and epidemiological transitions and the shortage of effective prevention programs are fueling the rise of chronic diseases, and the productive age groups (15-59) are the worst affected, perpetuating the cycle of poverty for families and nations.

**Funding decisions are based on demographic data that don't capture the seriousness of the problem**

Yet, for funding decisions, no mix of economic and demographic factors is being used by major donor agencies, including development banks. Rather, just demographic data, in particular the individual line items in the international classification of diseases are ranked using the disability-adjusted years of potential life lost (DALY) demographic calculation. And, chronic diseases as a group, requiring collective preventive action, are not aggregated in that particular estimate. Beyond that, the demographic estimates are based on extrapolations of sample survey data that are years old, and very unreliable in many countries and sub-regions.

**Preventive HIV/AIDS public health programs saved many lives**

Long before antiretrovirals could be tested in clinical trials and approved by the US Food and Drug Administration (FDA) against HIV/AIDS, concerted public health measures were able to slow the growth rate of the epidemic in the US even in the late 1980s and early 1990s. The same impact could be possible worldwide today for other chronic diseases. Nevertheless, it remains a disturbing fact that preventive public health programs on HIV/AIDS were only introduced about a decade later in developing countries while bets were placed in the meantime solely on HIV vaccine development against a highly mutating organism.

**Success can be replicated for chronic non-communicable diseases prevention**

On chronic non-communicable diseases, beyond the prevention programs that focus on behavioral change, such as using less salt to combat hypertension, more exercise and less sugar against diabetes, and avoidance of known carcinogens in cigarette smoke, there has been the growth in recent years of attention to nutritional solutions to combat chronic, and indeed infectious, diseases. In the post-war era as it rose from the ashes, Japan, for instance, made effective use of food and nutrition in addition to chemical medicines to eradicate or control most infectious diseases that continue to be scourges of many least-developed countries. Again, worldwide, there generally has been relative neglect of food and nutrition since the 1970s, which has become all too apparent with the food price crisis of this decade.

**Nutritional factors can help**

One of the few programs actively working on the area of functional foods to combat chronic and infectious diseases has been the Canadian-government sponsored Advanced Food and Materials Network (AFMnet). Its Chief Research Officer, Prof. Rickey Yada of the University of Guelph, is credited with advancing the goal of adding value to Canadian food, as Canada is a major grain, fish, meat, fruit and vegetables supplier to the world.

There are some nutritional factors such as Omega 3 Fatty Acids from fish oils with proven value in chronic diseases. The most compelling evidence for the cardiovascular benefit provided by omega-3 fatty acids comes from 3 large controlled trials of 32,000 participants randomized to receive omega-3 fatty acid

supplements containing docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) with controls. These trials showed reductions in cardiovascular events of 19% to 45%. The findings suggest that intake of omega-3 fatty acids, whether from dietary sources or fish oil supplements, should be increased, especially in those with -- or at risk for -- coronary artery disease.

In most parts of the world, there is little prospect for angioplasty or coronary artery bypass surgery given the financial cost and human resource constraints, and hence preventive measures and medications, where accessible, will be the protocol to manage ischemic heart diseases for at least 90% of the world's 7 billion population. Combination therapy with omega-3 fatty acids and a statin is a safe and effective way to improve lipid levels and cardiovascular prognosis beyond the benefits provided by statin therapy alone. Statin-like activity is seen in certain soy peptides. Other functional foods with promise are also in the process of being thoroughly analyzed in the laboratory and in the field. For instance, different fish peptides have value in diabetes/metabolic syndrome and as angiotensin converting enzyme (ACE)-inhibitors in hypertension control.

The Council for Responsible Nutrition is an industry organization of the supplements industry dedicated to enhanced quality, and its Vice President for scientific and regulatory affairs, Dr. Douglas Mackay, emphasized the importance of non-oxidized fish oils, and indeed of non-oxidized vegetable oils. Although in the industrial countries, that has become less of an issue, there are anecdotal reports of near-rancid (oxidized or hydrolyzed) fats and oils being sold in some developing countries with little regulatory oversight. The need for education and surveillance are indicated to ensure the quality of nutraceuticals and supplements sold around the world.

The serious epidemics of heart disease and cancers underway in developing countries will necessitate a nutritional solution beyond "strengthening health services" and drawing on the epidemiological evidence that Japanese, Canadians and Scandinavians who are among those who live off the oceans, live the longest in the world. Indeed, the World Health Organization has just confirmed this fact once again.

But there has to be greater research into what precisely it is that Japanese, Canadians, the Scandinavians and others do right that can be learned from. The Mediterranean diet and other traditional menus have been written about extensively, and are believed to have been carefully selected over centuries to promote good health -- but as Dr. Walter Willett points out, "people eat what they can grow, gather, kill or buy, and their choices are dictated by weather, geology, geography, economics and even politics." Further, Willett emphasizes that "diets that seem to be good for people whose days are full of hard physical labor aren't necessarily good for people who toil at the desk all day."

To assess the functional value of food, the pharmaceutical model used in clinical trials, and epidemiological studies of population cohorts have proven very inadequate. Something in between those two polar opposites is needed. A step in the right direction is the certification and labeling system in place for functional foods in Japan, which has the most advanced designation system at present for the health function benefits of food. Functional foods are recognized as a distinct category within the Japanese food supply: they are distinguished from foods simply fortified with vitamins or minerals or from dietary supplements and are called "Foods for Specified Health Use" or "FOSHU." The designation has proven value as an attraction for the Japanese population that today enjoys the longest lifespan. Similar certification, however, generally does not exist in most countries.

The value of fresh fruits and vegetables has been highlighted in the "healthy eating pyramid," the US Department of Agriculture's "food pyramid" and indeed in every food & nutrition recommendation (see here and here and here). They are known to have preventive value in chronic diseases, especially cancers. But the essence of what it is within vegetables that is preventing certain chronic diseases is still largely unknown -- for instance, is it lycopene in tomatoes or a combination of phytochemicals or phytonutrients within the tomato? And, there is much yet to be learned about the modus operandi of antioxidants and other components of fruits.

**Prevention is the key**

In a nutshell, preventing chronic diseases requires a great deal of multi-factorial training, innovation, research and action, because treating them once they arise is so costly in human and financial terms, for people, governments and indeed the economy. Ramping up prevention programs, worldwide, is the need of the hour.