POSITION PAPER
Personalized Lifestyle Medicine:
A Novel Therapeutic Approach to Chronic Illness

THE RISING TIDE OF LIFESTYLE-INDUCED CHRONIC DISEASES
The long-held belief that genes are our destiny is now outdated. Cutting-edge scientific research and medical opinions worldwide are now directed in a very different position, essentially indicating that our environment and behaviors, or, in other words, our lifestyle, may be the primary driver of our health outcomes. Indeed, our health may be more within our control than we realize. What we continue to learn from clinicians and researchers is that at the root of several modern-day chronic diseases is the mismatch between our genetics and environment. In fact, cardiovascular disease, type 2 diabetes, and obesity have been referred to as lifestyle-induced chronic diseases. It has been estimated that the majority of health care visits in industrialized visits are correlated with these lifestyle-induced, preventable diseases. Because of the exorbitant cost and lack of resources to deal with the rising tide of illness, the importance of lifestyle factors in the origin and progression of disease can no longer be ignored.

These lifestyle-induced chronic illnesses typically share the common risk factors of smoking, unhealthy diet and alcohol abuse, and physical inactivity. While these factors may play a large role in whether someone develops a lifestyle-induced disease, the extent of influence of each of them in every individual may be different. Lifestyle medicine, which is not a new or alternative medical discipline, acknowledges the multi-faceted aspects of health for the individual patient, enabling and requiring them to be intimately involved in their health journey with the accompaniment of a team of healthcare professionals. In conjunction with being a compelling solution to the chronic disease epidemic and allowing the patient to have control of their health, lifestyle medicine therapies have been shown to be cost effective.

THE NEED FOR A PERSONALIZED APPROACH TO HEALTH
General recommendations for chronic disease prevention from global opinion leader organizations such as the U.S. Department of Agriculture, American Diabetes Association, and the American Cancer Society have, in some way, included therapeutic lifestyle changes, such as maintaining a healthy weight, exercising regularly, eating healthy foods, and not smoking, to significantly reduce risk or as treatment for these chronic, debilitating conditions. These nutritional and lifestyle recommendations from disparate organizations are essentially similar, yet one might call into question whether these standardized public health positioning statements are sufficient to meet the diversity of the average individual, including addressing the multitude of variables such as age, lifecycle, gender, medical history,
family history, vitamin and mineral status, ethnic background(s), lifestyle habits, genetics, single nucleotide polymorphisms (SNPs), mutations, and epigenetics.

Thus, it may seem that these overall suggestions for healthy living could be made even more impactful through the process of tailoring a lifestyle medicine approach. For example, consider the following scenarios of how personalizing nutrition recommendations may be of benefit to the average individual:

- Guidance from the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) has recommended a dietary cholesterol intake of 300 milligrams daily for treatment of patients with dyslipidemias. However, research indicates that dietary cholesterol has very little impact on blood cholesterol, and that, furthermore, oxidized LDL-cholesterol and markers of inflammation may be more indicative of cardiovascular risk than total blood cholesterol. The question is – would the patient with high blood lipids be better served by focusing on anti-inflammatory foods and bio-actives, along with those substances that reduce the oxidation of LDL-cholesterol, and are there certain people that may respond to certain foods more than others? Could their dietary regimen be tailored more effectively and specifically based on laboratory measures and their genotypes for selected for determining efficiencies in biomarkers?

- General recommendations to reduce dietary salt intake have been advised to patients with hypertension for several years. Some research suggests that reducing dietary salt may be helpful for only a specific segment of these patients, typically African-Americans and the elderly population, thus giving rise to the term “salt-sensitive hypertension”. The inclusion of salt in the diet, however, may be important for individuals with stress- and aging-related conditions such as adrenal fatigue and achlorhydria (lack of sufficient stomach acid to digest protein). Rather than having this broad recommendation to have all hypertensive patients stop eating salt-laden foods, perhaps a more personalized strategy would be to match the patient’s genetic predisposition to salt-sensitive hypertension with their dietary prescription.

- Type 2 diabetics are often guided to eat low glycemic foods and synthetic sweeteners to blunt the glycemic response. However, many low glycemic foods may not be health promoting, such as ice cream and other high-fat foods which block the release of glucose into the blood. Additionally, there may be foods with similar glycemic indices, yet have a different phytonutrient profile that could be beneficial for the diabetic patient. For example, pasta noodles and pinto beans both have about the same glycemic index; however, they have very diverse nutrient profiles. A diabetic patient may theoretically benefit more from the whole pinto bean composition relative to that of enriched wheat pasta. With respect to synthetic sweeteners, the scientific landscape is changing dramatically to show that these seemingly inert
sweeteners are having signaling and other physiological impacts in the gut that may not necessarily be conducive to improvements in metabolism long-term.

These examples suggest there is a strong case to be made for the personalization of dietary recommendations. Similarly, there is increasing evidence and advocacy from science, industry, and government leaders that the national guidelines of increasing overall physical activity, preferably to a minimum of 150 minutes of moderate activity per week, may require some degree of personalization. There are multiple questions that could be addressed, including exploring the different forms of physical activity and their duration and intensity for each person, the benefits of exercising alone or in a group, and investigating whether it is helpful to participate in multiple types of physical activity. Furthermore, it may be worthwhile to examine how combinations of lifestyle medicine factors, such as gene variants, exercise, and disease state, may interact to prove more targeted, useful information to the patient. Also, there may be individualized responses not only to physical activity due to one’s genotype, but also compounded interactions between serum lipids, exercise, and gene variants.

In addition to diet and physical activity, often perceived as the two pinnacles of lifestyle medicine, there are the often overlooked major drivers of chronic disease – stress and subsequent behavior. Although stress has been estimated to be a substantial contributor to disease, there is relatively less emphasis on techniques to manage it within public health recommendations. The ability of a patient to modify their behavior and reaction to stress is a crucial aspect to consider for personalizing a treatment approach. It is conceivably difficult to successfully implement lifestyle changes in diet or activity unless there is an underlying adjustment in behavioral response to stress. Similar to nutrition and exercise, there is a role for personalization in one’s approach to stress, which can be encompassed in the variety of modalities one can choose from to modify their behavior to help them cope with stress, including mind-body medicine practices.

Finally, a pivotal aspect to consider in personalized lifestyle medicine recommendations is the influence of human exposure to environmental toxins on health. There are at least two sources of toxicants to quantify: the influx of exogenous sources of toxic chemicals from air, food, water, drugs, and radiation; and internally-generated metabolites from processes such as inflammation, lipid peroxidation, oxidative stress, disease states, and infections. An individual’s ability to metabolize environmental intoxicants, independent of origin, via the liver enzymes must be evaluated through indirect or direct genotypic means for a better understanding of the robustness of their excretion of these toxicants.

**THE LEADING-EDGE OF HEALTH: PERSONALIZED LIFESTYLE MEDICINE**

Indeed, it may be that the forefront of medicine involves not just tailoring one’s pharmaceutical prescription to one’s genes in order to more effectively prescribe drugs as we typically see with the emerging wave of personalized medicine. To be effective in reducing disease on a larger scale, we may need to traverse several steps further to apply the concept of personalization to lifestyle: essentially,
taking a patient’s laboratory biomarkers, genetics, and diagnostic values into account when fine-tuning lifestyle medicine strategies. It would seem that with the advent of personalized medicine and the emergence of diagnostics to assess one’s genotype and moment-by-moment biomarkers that dietary and lifestyle recommendations will inevitably become individualized to the patient. More robust, timely information on the patient will lead us to go beyond usual, population-prescribed therapeutic lifestyle changes and into tailored dietary regimens, physical activity patterns, stress management techniques, and/or reduction of environmental toxin exposure in the individual patient.

**Personalized lifestyle medicine** is a newly developed term that refers to an approach to medicine in which an individual’s health metrics from point-of-care diagnostics are used to develop lifestyle medicine-oriented therapeutic strategies for improving individual health outcomes in managing chronic disease. Personalized lifestyle medicine can be integral throughout a patient’s life, from prevention to pre-clinical symptoms to disease manifestation and progression. It encompasses a broad array of disciplines in order to effectively prevent and treat disease. The delivery of personalized advice requires accurate measurements of one’s physiology through genomic analysis and molecular diagnostics. Tailored biomarkers, molecular imaging, rapid assessments, though point-of-care devices, telemedicine, and individualized therapeutic treatments are gradually replacing the standardized, “one size fits all” form of medicine, ultimately providing the best form of care, reducing costs, and enhancing safety by limiting side effects.

It is exciting to think of the opportunities that personalized lifestyle medicine will bring to health care by bringing together several worlds – genomics, molecular biosciences, technology, biomarkers, behavioral sciences, and environment – into an emerging, broad-spectrum approach to health.

**THE PERSONALIZED LIFESTYLE MEDICINE INSTITUTE (PLMI)**
The Personalized Lifestyle Medicine Institute (PLMI) is a non-for-profit organization, founded in 2013 by Jeffrey Bland, PhD, an internationally-known biochemist and educator in lifestyle and functional medicine, dedicated to promoting the importance of personalized lifestyle medicine as the right solution to address patient-specific needs in chronic illness management. Solutions to these chronic health problems will require different approaches that apply innovative and evolving technologies. PLMI collaborates with leading medical experts, scientists, educators, advocacy groups, medical institutions, medical societies, and legislative groups to further its mission to integrate the principles of personalized lifestyle medicine for the prevention and management of chronic illness in healthcare systems worldwide.

Find us at [www.plminstitute.org](http://www.plminstitute.org).

**References**