Lifestyle medicine potential for reversing a world of chronic disease epidemics: from cell to community

The leading causes of mortality worldwide are chronic diseases, resulting from lifestyle and environmental factors. The economic burden of poor lifestyle choices is no longer sustainable and impossible to ignore. Most chronic diseases are preventable. To treat the causes of these diseases and to be successful in prevention, a strong focus must be placed on lifestyle medicine aspects. Lifestyle Medicine encompasses research, prevention, diagnosis and treatment of dysfunctions caused by a non-physiological lifestyle (lifestyle-related diseases, LRDs) and morbidogenic environments conducive to promoting such lifestyles. The ultimate goal and primary focus of Lifestyle Medicine is to promote healthier lives through salutary environments and healthier lifestyle choices. Treatment of LRDs includes nutritional, exercise, psychological, social, economic and environmental interventions. To successfully do this requires education, training and communication about Lifestyle Medicine at the professional and general public level, while avoiding the trap of 'victim blaming' of individuals whose lifestyles are influenced by circumstances beyond their control.

The current health crisis

The leading causes of mortality worldwide are chronic non-communicable diseases (NCDs); cardiovascular disease (17 million), followed by cancer (7.6 million), respiratory disease (4.2 million) and diabetes (1.3 million) (1). The newly published Global Burden of Disease Study (2010) has systematically highlighted the epidemiological shift in morbidity and mortality resulting from infectious diseases and malnutrition, to NCDs (2). While we have gained approximately 10 years of life expectancy since 1970, we are spending more years living with injury and illness (2). Representing 63% of all deaths, most that die from NCDs are in the prime of their productive years (3).

There is now overwhelming evidence that lifestyle factors such as poor dietary patterns, physical inactivity, tobacco use, excessive alcohol consumption and psychosocial factors, e.g. chronic stress and lack of social support and community, are key proximal factors in the pathogenesis and incidence of NCDs (4). Lifestyle factors may also be more distal stressors, including economic, political or a high density population (5).

We define lifestyle-related diseases (LRDs) as diseases where the pathophysiology is significantly influenced by lifestyle factors and where a change in these aetiological factors can significantly improve prevention and treatment of the disease.

The world’s population has more and more adopted an ‘unnatural’ environment to which it has not had a chance to adapt physiologically. This leads to numerous biological dysfunctions, probably stemming from a form of low-grade systemic inflammation, which underlies most chronic diseases and risk factors such as hyperlipidaemia and hypertension. The first sign of such an unadapted lifestyle accumulating allostatic load is often increased body weight through a hypercaloric diet and inadequate physical activity (6). It is imperative that we finally and systematically address the underlying causes of LRDs rather than superficially treating symptoms. Today, one in two Americans and Europeans is either overweight or obese (7). Average body mass indices have on average risen by as much as 2–2.5 kg/m² per decade and is now 30 kg/m² or higher in some countries (8).

As humans, we are designed to move, yet we have never been more sedentary. Physical activity has decreased drastically over the past century, because of economic growth, digitalisation and urbanisation. Over 70% of people in much of the modern industrialised world are not achieving adequate levels of health-promoting physical activity (7). The impact of poor lifestyle is not limited to physical diseases but also increases the risk for mental disorders such as depression and anxiety, which is increasing worldwide (9).

The economic burden of poor lifestyle choices is no longer sustainable and is impossible to ignore. LRDs have been established as a clear threat not only to human health but also to development and economic growth (2). Paradoxically, however, it is the...
latter that are also causal factors in the development of LRDs (10). At a time when the power of comprehensive lifestyle changes to prevent and reverse chronic diseases is becoming well-documented, the limitations and costs of high-tech medicine are becoming clearer (11–13).

**Lifestyle medicine as a clear solution**

Building on the existing definition (14), the American College of Lifestyle Medicine, the Australian Lifestyle Medicine Association and the European Society of Lifestyle Medicine define Lifestyle medicine (LM) as:

Lifestyle medicine is a branch of evidence-based medicine in which comprehensive lifestyle changes (including nutrition, physical activity, stress management, social support and environmental exposures) are used to prevent, treat and reverse the progression of chronic diseases by addressing their underlying causes.

Lifestyle medicine interventions include health risk assessment screening, health behaviour change counselling and clinical application of lifestyle modifications. Lifestyle medicine is often prescribed in conjunction with pharmacotherapy and other forms of therapy.

Lifestyle medicine is an inter-disciplinary field of internal medicine, psychosocial and neurosciences, public and environmental health, and biology. Key LM principles include prevention strategies that address lifestyle habits, the underlying biological causes (also more distant causes such as urban design initiatives to make cities and neighborhoods more social and conducive to healthier lifestyles), and the pathophysiology common to LRDs (e.g. low-grade systemic inflammation, dysregulated stress axis, metabolic dysfunctions etc.). As such, LM is an adjunct form of treatment that helps to bridge the best aspects of public health and conventional clinical medicine.

Addressing lifestyle factors has the potential to reduce the burden of chronic disease to the health system, and increase quality-of-life and longevity in the individual. For example, in the European Prospective Investigation into Cancer and Nutrition study of 23,000 people, changes in lifestyle factors could potentially prevent 93% of diabetes, 81% of heart attacks, 50% of strokes and 36% of all cancers (15).

In addition to LRD prevention, comprehensive lifestyle changes can reverse disease progression. When we address these root determinants of our health, we find that our bodies often have a remarkable capacity to begin healing themselves, and much more quickly than had once been thought possible (16–18). Moreover, LM treatments result in significant cost savings because the regenerative and biological mechanisms that control our health and well-being are so efficient once a physiological lifestyle is adopted (19).

If stressors (such as factors of an unhealthy lifestyle) recur repeatedly or persist over a longer time period, allostatic regulatory stress responses either can prevail or the organism cannot mount an adaptive response (20), culminating in a final common pathway of activated neurotransmitters, neuropeptides, hormones and cytokines which mediate pathophysiology. LRDs can be understood in the framework of driving the body’s adaptive capabilities to an unphysiological state (i.e. accumulating allostatic load) (21).

With our improved understanding of the molecular and cellular pathophysiology of LRDs, such as telomere length and epigenetics (22–25) we must now translate the research (aetiological, including psychological and intervention studies) into physiologically and psychologically healthier ways of living.

**Challenges in lifestyle medicine**

Patients are often confused by seemingly conflicting health and lifestyle recommendations conveyed through the media. It is vital that health professionals clearly communicate that there is no doubt about the basic constituents of a healthy lifestyle; including daily moderate physical activity, avoidance of tobacco and chronic stress, a diet high in whole plant-based foods and minimising consumption of meat and processed foods. There must be clear communication on the magnitude of benefit(s) possible and the magnitude of lifestyle change necessary to achieve it. These basics can be interpreted in many ways and in a variety of cultural settings, for instance ‘Asian’ or ‘Mediterranean’. Safe, effective, sustainable and evidence-based lifestyle recommendations must be included in the education and training of health professionals and journalists, so they may in turn be communicated to the general public. Influential organisations must be positioned at the intersection of industry and consumers, to co-ordinate the development of real-life, evidence-based health-promoting products and services. Obviously, this presents a challenge as many large commercial organisations (and Governments) have a vested interest in maintaining consumption at a level that is ultimately unhealthy to the individual. Recognising these more ‘distal’ factors on the causal hierarchy, however, is part of the process of Lifestyle Medicine.

A recent survey found that a high proportion of patients attending primary care with unhealthy lifestyles do not perceive the need to change their habits, and about half the patients reported not having had any discussion on healthy lifestyles with their
family doctors (26). There is an unexplained and no longer bearable time lag between the overwhelming evidence for the harmful health consequences of an unhealthy lifestyle and taking meaningful action at the individual, social and societal level to modify these behaviours and morbidogenic environments. In particular, medical care does not often address lifestyle changes as a primary concern (27,28). Medical practitioners are often unable to cope diagnostically and therapeutically with patients in urgent need of lifestyle changes. The competence and confidence to diagnose and change unhealthy behaviour is lacking (29). We must improve education and training in the treatment and prevention of lifestyle-related diseases (30). There needs to be changes in attitudes and perspectives such that practitioners understand therapeutic lifestyle changes to be the most scientifically valid, clinically effective and achievable treatment possible for most common conditions (LRDs) (31). Practitioners need to be taught how to base even 5 to 10 min on lifestyle medicine principles (30), while we work collectively to establish better delivery mechanisms that reflect the evidence demonstrating more contact time is more effective at producing meaningful lifestyle changes. Perhaps it is also time to look at different forms of health care delivery based on the altered needs of new conditions. Group visits (Shared Medical Appointments) in primary care for example, that include multi-disciplinary input and peer support, may be more appropriate for LRDs than the one-on-one system of consultation that was historically developed to deal with microbiological causes (32). In the modern era of evidence-based medicine, it is substandard practice not to offer the treatment option, or primary recommended therapy, of effective lifestyle medicine services. The provision of evidence-based, safer, more effective and less expensive lifestyle medicine services are the privilege and duty of every practitioner, patient and healthcare provider on every continent today. It will require the collective efforts of all parties to deliver patients, providers, and economies from the tyranny of the present high-cost, low-effectiveness system of lifestyle symptom care. To deliver effective care in today’s world requires treating the lifestyle causes as the foundation of care.

Global action for lifestyle medicine

The United Nations General Assembly held a high-level meeting in 2011 on the prevention and control of non-communicable diseases, calling for commitment and collaboration between and within governments, the private sector, civil society, the United Nations and international organisations (33). In June 2012, the American Medical Association reached a resolution to “…urge physicians to acquire and apply … lifestyle medicine, and offer evidence-based lifestyle medicine interventions as the first and primary mode of preventing and, when appropriate, treating chronic disease within clinical medicine” (34). A new systematic review identified a range of population-based strategies aimed at promoting lifestyle change, and called for the development of initiatives and partnerships to translate the evidence into action (35). We note that all of the above should be carried out in the knowledge that individuals are often at the mercy of their broader social, physical and economic environments. The notion of ‘victim blaming’, as can occur in cases of inequity, must be avoided if LM is to have an effective role in modern healthcare. We must bring together a multi-disciplinary wealth of stakeholders, to: (i) raise awareness of LM among practitioners; (ii) promote and support LM research and clinical LM in the prevention and treatment of LRDs; (iii) offer educational programs and incorporate LM into university curricula and medical and allied health training; and (iv) unite all LM practitioners, researchers, students, educators and policymakers globally.

M. Sagner,1 D. Katz,2,3,4 G. Egger,5 L. Lianov,4 K.-H. Schulz,5,7 M. Braman,4 B. Behbod,1 E. Phillips,8 W. Dysinger,9,10 D. Ornish11,12
1European Society of Lifestyle Medicine, Paris, France
2Yale University Prevention Research Center, Derby, CT, USA
3Integrative Medicine Center, Griffin Hospital, Derby, CT, USA
4American College of Lifestyle Medicine, Woodburn, OR, USA
5Australian Lifestyle Medicine Association, Fairlight, NSW, Australia
6Department of Sports Medicine, University Medical Center Eppendorf, Hamburg, Germany
7Institute of Medical Psychology, University Medical Center Eppendorf, Hamburg, Germany
8Department of Physical Medicine and Rehabilitation, Harvard Medical School, Institute of Lifestyle Medicine, Boston, MA, USA
9Lifestyle Medicine Institute, Loma Linda University, Loma Linda, CA, USA
10Department of Preventive Medicine, Loma Linda University School of Medicine, Loma Linda, CA, USA
11Preventive Medicine Research Institute, Sausalito, CA, USA
12University of California, San Francisco, CA, USA

Correspondence to:
Michael Sagner, MD, European Society of Lifestyle Medicine, Paris, France
Email: sagner@eslm.eu