The conference on climate change in Paris highlighted the possible significant increase in the incidence of diseases due to environmental changes, which may affect a variety of systems (respiratory, locomotor, and gastrointestinal) and millions of people, sometimes with fatal consequences. Moreover, the World Health Organization (www.who.int) implemented several workshops, whose outcome was a set of important scientific documents with annexed guidelines (http://www.who.int/healthinfo/sage/SAGE_Meeting_Dec2012_StoneA.pdf) concerning the evaluation of objective/subjective wellbeing as related to the socioeconomic environment. Alongside these issues, a variety of forms of tourism aimed at health, experience, and awareness are being developed. The Thermae and the relevant regions are, therefore, important players in this challenge, which can be considered as a major one for modern civilization, namely environmental, human, and personal development and sustainability.

Thermal medicine, an old therapy that is currently applied in advanced countries according to strict scientific criteria, is now involved in this process to its full right and offers its potential for prevention, care, and rehabilitation to millions of patients all around the world. A stay at a thermal station, if well managed and organized, allows to “review” and “adjust” one’s lifestyles, which are responsible for most active diseases.

The cultural and structural wealth of “thermal regions”, sometimes a true legacy of the past experienced through a modern approach, is a natural “soul medicine” complement, according to a modern interpretation of complex body systems and mind/body relations. All the above involves multiple components and also represents an important factor for the socioeconomic development of thermal regions. Environment, health resorts, and tourism are the pillars of a complex structure that may affect the quality of life both in health and economic terms. However, their harmonious development calls for analyses, evaluations, and practical proposals.

FEMTEC, in the vision of new integrated development models, engages with specialists and the National Government Institutions in charge of health and territorial planning.

In 1969, the Centre for Research on Medical Bioclimatology was founded in Italy, at the Milan University, by Professor Roberto Gualtierotti, later managed by Professor Umberto Solimene. The Centre’s activities, connected with those of FEMTEC, can be reviewed at www.femteconline.org. They are primarily aimed at studying relations between human health and weather changes (meteoropathies); climate change and health; characterization of tourist thermal establishments for therapeutic purposes.

The Centre is now a Biometeorology Research Unit (Doctor V. Condemi) based at the Department of Biomedical Health Sciences, within the framework of the activity of the School of Motor Sciences (Professor F. Esposito), and has cooperation agreements in place with FEMTEC-WHO (Professor U. Solimene).

It is also very busy in the educational sphere, including with the recent event Labirinti d’acqua, organized on occasion of the World Water Day (www.labirintodacqua.it).

By way of example, we hereby introduce a brochure on Italian climate and its characteristics according to its action on the individual human body systems.

In the 4th century B.C., with the treaty *Airs, waters, and places* [1], Hippocrates from Kos stressed – at the dawn of medicine – the utmost importance of the potential effects of the environment, and particularly, of climate on human health, as well as on its restoration during or after a disease. In another important work, *Prognostics*, Hippocrates focused on the structure of diseases, and in *Epidemics* he summarized the assumptions set out in *Prognostics* and the climatic and geographic conditions postulated in *Airs, waters, and places*. Today these intuitions are consistently confirmed by science based on the combination of two important factors: on one hand, a deep climate change is under way, and on the other the average life expectancy is increasing, particularly in industrialized countries, where new risk categories, unknown in the past, are now introduced alongside the classical fragile groups. As a result, the influence of weather and climatic factors on the pathogenesis of several illnesses has gradually been given solid
scientific evidence. The broad scientific literature available on the topic includes epidemiological and clinical studies with a wide and documented range of adverse health outcomes observed after short and long-term exposure as a consequence of weather changes. Weather phenomena in general, and extreme ones in particular, are therefore part of a long and deep climate transformation process that has a clear epidemiological meaning for individuals at risk, fragile groups, and vulnerable countries-systems. One example in this respect is acknowledged by the World Health Organization, which paid great attention to the fluctuations of the phenomenon El Nino (ENSO) that have important epidemiological consequences in broad regions of the world and for a variety of diseases. With a thorough search of literature, the WHO also analyzed the climatic system and its changes to build predictive models for specific infectious diseases and potential micro and macro-epidemics in a future projection (known as climate change sensitive diseases).

Some of its reports summarize consolidated scientific evidence [2], [3]. Several studies were carried out to understand the links between weather, climatic, and environmental conditions and the onset of illness, both acute and as an expression of new acute phases of disorders mostly affecting the respiratory tract and the cardiovascular system. Studies were also carried out on the number of patients admitted to the ER using measures of the association between diseases and winter weather conditions, Rusticucci et al. [4]. Makle et al. [5] focused on the links between weather factors and daily and weekly variability in patients admitted to the ER in Fukuoka, Japan. In another study, Kovats et al. [6] elaborated on the dual aspect of mortality and morbidity following an remarkable heat wave in London. Vulnerability and mortality correlated with heat waves in cities were broadly analyzed by, among others, Besancenot [7] using a general methodology on a national scale, and by Stafoggia et al. [8] with approaches focused on different populations of city dwellers. Following a contribution by Curriero et al. [9] embracing 11 US cities and funded by the European Commission Fifth Framework Programme, a complex European Research Project was carried out (Assessment and Prevention of Acute Health Effects and Weather Conditions in Europe – PHEWE – 2002-2005) with the main purpose to investigate associations between certain weather variables and their effects on human health (acute health effects) with a strictly epidemiological approach. The findings of this multi-centric study published by Michelozzi et al. [10] demonstrated a close association between heat waves and respiratory diseases, whereas a loose association was observed with cardiovascular diseases that called for admission to the ER. This applied research process also included specific Programmes, carried out with multi-centric and other approaches, aimed at designing and testing meteo-climatic-epidemiological models where the central role of the weather-climate-human health relation promoted the creation of mitigation and/or prevention models. Most investigations only focused on individual cities and the relevant urban context. Only a brief list is provided here: Thirion [11] on Marseille; Semenza et al. [12] on Chicago; Ballester et al. [13] with studies focused on Valencia; Dessai [14], [15] on Lisbon; Revich et al. [16] on Moscow; Hu et al. [17] on Sidney; Tan et al. [18] on Shanghai, Díaz et al. [19] on Seville, Nastos et al. [20] on Athens with special care, in this work, on the onset of respiratory disorders correlated with weather types; moreover, Yip et al. [21] considered a whole region – Maricopa County, Arizona. Johnson et al. [22] contributed to expand the field of analysis by comparing broad geographic regions, such as England and Wales, supported by estimates on winter mortality.

Another interesting study was carried out in France by Laaidi et al. [23], who introduced analyses on a variety of environmental and climatic contexts with respect to the GW. With reference to climatic change, the WHO [24] with a perspective global scenario, as well as the Ministry of Health [25] and the Higher Health Institute [26] for Italy, provided a significant input derived from the health effects produced by the heat waves recorded in 2003, later elaborated and confirmed in the light of the latest IPCC Report [27]. The consistent scientific production developed in the past decade resulted into a meta-analysis on mortality carried out by Weiwei Yu et al. [28] on publications focused on two meteo-climatic categories – winter (cold) and summer (heat) – which highlighted a closer relation with mortality in summer conditions (hot environment).

References


