

## **Roadmap for Tackling Obesity in HORIZON 2020**

This document is a roadmap addressing an innovation programme for managing the obesity epidemic in Europe up to 2020.

### **Background**

The prevalence of childhood and adulthood obesity is high and still increasing in many countries in Europe and worldwide. Thus, obesity represents a heavy burden on the individual, the healthcare systems, the efficiency of the workforce and on society at large. At the same time, no other lifestyle condition has the same level of visibility and attention from the individual, the society and from the media. Tackling obesity is a cornerstone in preventing type-2 diabetes, metabolic syndrome and cardiovascular disorders, as well as some types of cancer, musculoskeletal disorders and others.

The European Association for the Study of Obesity (EASO) estimates that 40 to 70 percent of adults are overweight in European countries; within the next ten years two out of three persons will be overweight or obese in Europe. Both the public and private healthcare sectors will severely suffer from this epidemic. There is an on-going and disproportionate increase in healthcare expenditure for the treatment of individuals with obesity.

Through the last decades substantial efforts and expertise of several research fields have led to significant progress towards understanding the factors involved in the development of obesity. In particular, the role of genetic and physiological mechanisms contributing to the regulation of body weight and the beneficial effects of physical activity, certain diets and food components have been explored. Many of these activities were performed in a collaborative manner across Europe and supported by the European Union. To date, the proportion of the obesity epidemic explained is rather small. Therefore - despite these large scale activities - the success of many of the obesity prevention and treatment programmes which were developed in the past years is less than satisfactory (only modest effects) at the individual and population levels in the medium and long term. Currently, bariatric surgery is the only therapeutic approach which entails long-term weight reduction for severe forms of obesity, although it is associated with a significant risk of adverse effects.

As with other complex disorders it has become evident that many (environmental, including social and cultural, psychological, physiological and genetic) factors underlie obesity, many of which are currently still unknown. Subjects with obesity do not necessarily share all these risk factors. Due to this heterogeneity it is more appropriate to view obesity as the common phenotype of several distinct disorders.

A major stumbling block for both prevention and treatment is that we do not have sufficient knowledge to the health risks associated with obesity on an individual level. Thus, whereas two thirds of individuals with obesity develop complications, one third does not. A better understanding of the individual factors entailing elevated risks for specific sequelae of obesity will lead to better prevention and treatment strategies that can be targeted to individuals with specific risk constellations.

Not enough attention has been devoted to understand the obesity epidemic in the light of varying social and cultural conditions of European countries, and to addressing the future balancing of, on the one hand, the responsibility and actions of society and policy makers in changing the environment and living circumstances and, on the other hand, the responsibility and autonomy of the individual to choose his/her own lifestyle.

## The challenge

To tackle the obesity epidemic and to reach a healthy lifestyle for the European population it is more than necessary to transfer the scientific knowledge together with policy makers and all other stakeholders into public strategic prevention and treatment programmes, which ideally should be available for the general population at a cost-effective, evidence-based and best-practice level. Obviously, scientific knowledge is crucial in this context entailing that its basis must be enlarged. At the same time, this knowledge has to be aligned with ethical, social and policy research in order to develop a comprehensive strategy for preventing and treating obesity, avoiding e.g. further increments in stigmatisation of children and adults with obesity.

## Opportunities to tackle the obesity epidemic in Europe

This roadmap should encourage the European Commission and policy-makers to consider prevention and treatment of obesity as a major goal for HORIZON 2020. In the following, innovative steps to tackle the growing obesity epidemic are addressed.

- The effect of currently available prevention and weight loss programmes is seemingly rather limited due to both the obesogenic environment and the biological make-up inherent to a substantial proportion of humans (and other mammals) that promotes fat deposition in periods of abundant and tasty food supplies. There is clearly a need for addressing **societal conditions which promote the development of obesity. We also need to better understand the interaction between specific obesogenic factors and individual behaviour, biology and physiology.** Obesity treatment and prevention programmes need to be evaluated from the public health perspective; coordinated **national strategies** based on best-practice as well as evidence-based to manage the obesity epidemic in all age groups and in different settings should be a major focus in the future. Such efforts require the careful monitoring of potential adverse effects of such strategies.
- Because **stigmatization** of individuals with obesity entails additional health risks, exclusion from the work force and probably impairs the effectiveness of measures to combat obesity, we need to ensure that stigmatization of people affected by obesity is not intensified. Research is required to learn which public messages/programmes increase or decrease stigmatization. Public health strategies should not raise the burden of subjects with obesity.
- There is a clear need for a better understanding of the consumer's food choices and lifestyle preferences including the socio-economic and societal perspective. It is necessary to define and develop conditions under which consumers make more healthy lifestyle choices (**societal perspective**).
- An effective pharmacological treatment is currently not available. We need to foster research which will lead to the development of **novel drugs** for the treatment of obesity and its complications. Such research not only includes biomedical aspects; we also need to address regulatory issues to ensure that the development of novel medications will remain feasible. In this context, it is important to realize that after several decades of small advances only, biomedical research has recently led to substantial improvements in the treatment of diverse types of cancer. We foresee a need to critically evaluate the implications of adverse effects. It seems disproportionate to not tolerate infrequent drug related adverse effects while at the same time propagating bariatric surgery with its known mortality and health risks.

- For the population with severe obesity more effective, integrated and combined interventions such as intensive lifestyle modification programmes, pharmacological treatments and bariatric surgery should be considered and reviewed concerning **ethical implications, costs, long-term efficacy, and adverse effects**. Research is required to better understand the metabolic and endocrine alterations induced by such interventions.
- We need more information to be able to better treat specific comorbidities in patients with obesity (e.g. cancer, lung diseases). **Guidelines** for the medical treatment of specific disorders must be developed for persons with obesity and implemented in the medical community; adequate reimbursement must be pursued.
- Body mass index (BMI), taken by itself, is not a suitable measure of the risks associated with obesity. Individual factors that determine the health risks of obesity (obesities) need to be better characterized using current biotechnological tools (“**deep phenotyping**”) and to be **implemented in the diagnosis** of obesity at the population level within the context of the vision of individualized medicine.
- Early prevention through interventions before and during pregnancy and during early childhood that modulate the early **developmental origins of disease** risk are promising. The potential of such early interventions for reducing the long-term risk of obesity and associated disorders should be explored and implemented into routine clinical care.
- Recent development of **bio-monitoring** technologies provides opportunities to allow persons a better **self-monitoring** of body weight and other risk parameters and might, therefore, empower people to make health-promoting decisions in their daily routine. Further research concerning these technologies and establishment of private-public-partnerships has the potential to advance this field.

### Goals for 2020

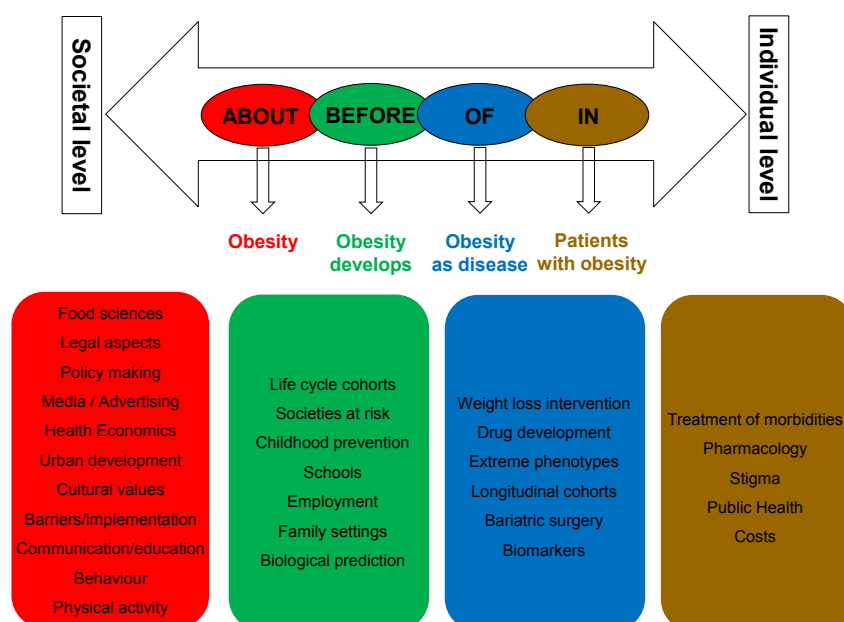
In view of these defined challenges and opportunities substantial progress is to be made by the year 2020:

- Development of more efficient primary prevention programmes for the general population to stop and reverse the increase in the overall obesity prevalence in Europe and to achieve a healthy body weight on an individual level.
- Building up a less obesogenic European environment (from food labelling to more facilities for physical activity) offered to all age and social groups.
- Enhancing knowledge of individual risk factors that promote the development of fat accumulation and medical complications of an elevated fat mass. The concept of obesity as the common phenotype underlying several different types of interactions between environmental and biological risk factors needs to be explored.
- Identification of risk groups and reduction of the co-morbidities and social impairments associated with obesity by 20 percent.

- Increasing the quality of life of the population with obesity (from medical treatment to a societal point of view).
- Stopping the rapid secular increase in citizens with extreme obesity (BMI > 40 kg/m<sup>2</sup>) by early identification of at risk individuals, prevention of continuous weight gain, development of more intensive and sustained conservative weight management programmes, improving bariatric surgical techniques and the development and licensing of novel drugs. These strategies encompass biomedical research into the mechanisms underlying the development and maintenance of obesity.
- Improving general health in the population at acceptable costs by a quick transfer from the scientific knowledge to public strategies for prevention and treatment of obesity.
- Achievement of truly interdisciplinary research to best identify risk factors at an individual level, to come up with the optimal personalized or stratifying treatment strategies for those affected and to develop promising prevention strategies with no or minimal adverse effects.

As the aetiology of obesity and its complications is the consequence of highly complex influences ranging from the genetic background to diverse societal changes, solving the associated problems for the European societies can only be achieved by a variety of measures and activities addressing this complexity in a multi- and cross-disciplinary approach (see Figure 1). Such potential solutions need to be regularly evaluated using adequate tools and continuously improved. To be able to promote and coordinate such multi- and transdisciplinary (“transformative”) research activities to adequately address this complex system, a matrix model is proposed which allows a better integration of the topics, instruments and methods as well as players.

**Figure 1:** A matrix model to integrate the cross-disciplinary approach with societal interests/efforts to address the complexity of obesity in a more effective, best-practice and evidence-based strategy.



On the societal as well as on the individual level the focus is on the human being itself with all the challenges the obesity epidemic brings: Knowledge **about** obesity, prevention **before** obesity, treatment **of** obesity and living **in** the obese state. Scientific progress addressing so far neglected or understudied aspects as well as continuous transdisciplinary (“transformative”) evaluation of the current state of the art is an essential prerequisite for the development of promising approaches to combat obesity. Combining scientific knowledge with ethical, legal, social and political aspects will provide the basis for comprehensive strategies and approaches both in prevention and treatment of obesity. Translation and implementation of advances in research into clinical practice and prevention have to be outpaced in order to maximize the effectiveness of measures taken for tackling obesity. As a result, a substantial reduction of the obesity prevalence, the associated health burdens and social impairments can be achieved by establishing less obesogenic environments, curing the obese with novel approaches and preventing obesity by comprehensive strategies in all societies throughout the European Union.

Especially the societal challenges like lack of physical activity, unemployment, eating outside (e.g. schools), longevity, stigmatization, media (television, radio, facebook, smartphones) – to list only some examples – have to be interlocked. It is indispensable to integrate experts from the socio-cultural and technological disciplines into the currently dominating biomedical, epidemiological and clinical approach towards obesity. Partnering-Days as well as “Idea-Workshops” with persons from policy and industry would be a good approach.

Writing committee:

Hans Hauner, Johannes Hebebrand, Manfred J Mueller, Jens Ried, Thorkild Sørensen, Michael Stumvoll, on behalf of the German and Danish Obesity Research Networks.

This writing committee was established during the German-Danish workshop held in Munich on December 8<sup>th</sup> 2011, and the content reflects the committee’s interpretation of the outcome of the workshop. The discussion at this workshop followed the Danish Consultation process and discussion at a workshop held in Copenhagen, August 18<sup>th</sup> 2011.

Coordination:

German Competence Network Obesity  
Christina Holzapfel (scientific manager)  
University Hospital “Klinikum rechts der Isar”  
Technische Universität München  
Uptown Munich Campus D  
Georg-Brauchle-Ring 60/62  
80992 Munich (Germany)  
Phone: +49-89-289-24923  
Email: Christina.Holzapfel@tum.de

February 2012