



EARLY NUTRITION

Long-term effects of early nutrition on later health

Frequently Asked Questions

www.project-earlynutrition.eu

QUESTIONS CONCERNING EARLYNUTRITION AS AN EU PROJECT

Q What are the key facts about EarlyNutrition?

A EarlyNutrition is worldwide the largest project investigating nutritional programming effects for obesity and health later in life.

The EarlyNutrition project started on February 1, 2012. The project will last 60 months and is anticipated to end January 31, 2017. With €8.96 million in funding by the EU towards a total budget of €11,12 million, EarlyNutrition will implement an ambitious research

programme bringing together partners from academia, industry and Small and Medium Enterprises (SME). The project comprises 36 partners from Europe, USA and Australia is coordinated by Prof. Berthold Koletzko and team from the Ludwigs-Maximilians University in Munich, Germany. The EarlyNutrition research programme is divided into four different scientific themes including:

1) mechanisms of early nutrition programming effects, 2) observational studies of determinants in contemporary cohorts, 3) randomized human intervention studies on modifiable determinants, and 4) the development of evidence based recommendations for nutrition, for the four phases: pre-pregnancy, pregnancy, infants and children. These themes are strengthened by multidisciplinary collaboration from experts in their respective fields. in their respective fields.

Q Why are collaborative research projects funded by the EU?

A Research projects requiring the collaboration of scientists from different countries are beyond the scope of national initiatives and thus receive financial support by the EU under the cooperation scheme.

All research-related EU initiatives are administered under a common roof called the European Framework Programmes. The present framework programme 7

(FP7) was launched in 2007 and is worth a total of €8.1 billion. FP7 aims to gain and consolidate leadership in key scientific and technology areas.

Projects are open to organisations and businesses in all EU Member States, FP7 partner states, and other eligible countries. Specific areas and topics are supported in rounds of publicly advertised calls for proposals, which touch on many aspects of daily life such as food safety and

combating major diseases.

EarlyNutrition is working to achieve the aims of the FP7 concept in its project. It has defined a systematic approach which builds on the expertise of researchers from 12 European countries, the United States and Australia. This is extremely valuable as research on early nutrition programming has been conducted in a rather scattered manner throughout the world for years while at the same time obesity and its related diseases have increasingly become a global health concern.

Q How many research institutions participate in EarlyNutrition?

A 36 expert research institutions from 12 European countries, Australia, and the United States participate in EarlyNutrition.

The EarlyNutrition consortium includes internationally acknowledged leaders from their respective institutes in the

areas of pregnancy, infancy, nutrition, clinical trials, and biomedical research. The current project is based on a successful international research collaboration funded under FP6 called EARNEST¹, which investigated early nutrition programming

effects and successfully determined a programming effect of early nutrition on obesity.



Q How will progress and success within the project be measured?

A The consortium is bound by a contract with the European Commission (EC) that specifies clear reporting obligations, which the researchers have to fulfil in order to provide evidence about their progress towards identified goals and qualify for the stipulated funding.

In addition to official reporting, the consortium will continuously present the project results at scientific conferences, in peer reviewed journals and online on the EarlyNutrition website. In addition, the partners will meet twice a year in person for scientific exchange and dis-

cussions of future steps. The EarlyNutrition project will therefore make its results and achievements publicly available to researchers as well as national stakeholders and also engages in public communication activities.

EarlyNutrition partners have signed a contract with the EC identifying research tasks, which are associated with 182 deliverables. Deliverables are measurable outcomes, like a written report, providing details about the results obtained within a given task. At specific intervals, the whole consortium will submit a report to the EC that will include scientific

results as well as financial and administrative details. These reports need to be approved by the EC before further funding is paid out to the researchers. Successful progression of the project will be measured by the timely achievement of its deliverables, as well as the dissemination of these results to the appropriate target audiences.

The overall progress of the research will be closely monitored internally, but also by a scientific advisory board and by independent experts assigned by the EC.

Q How much will EarlyNutrition cost?

A The total project budget is €11.12 million, of which no more than €8.96 million will be borne by the EC pending that the consortium meets its stipulated obligations.

The effective funding by the EC is dependent on the occurred actual costs of the partners and the positive review

of the official reports. Most of the financial allocation will be attributable to personnel costs, and therefore the project will create job opportunities for established, highly qualified researchers, as well as for identifying new investigators at respected research institutions throughout Europe.

The EC reports that EU research funding generates significant added value for Europe as a whole. For example, one Euro of EU Framework Programme funding leads to an increase in industry added value of between €7 and €14.²

Q What are the aims of EarlyNutrition?

A EarlyNutrition aims to expand the scientific understanding of metabolic programming effects and their contribution to obesity and related disorders.

Numerous previous studies have determined that the early nutritional and lifestyle experiences of a child can dispose children towards obesity later in life. However, evidence based associations

and mechanistic insight into how metabolic processes can determine health outcomes later in life are still limited. In order to bridge this gap, the EarlyNutrition project has developed an ambitious research programme to elucidate the mechanisms of metabolic programming. Thereby it aims to provide insight into the causes and solutions of obesity and related disorders as well as giving

people an idea on how to best intervene with the adverse programming effects in early life.

By extending project data to relevant stakeholders including the food industry, decision makers and national panels, among others, EarlyNutrition is committed to ensure that the latest scientific data are incorporated into relevant recommendations to improve clinical practice without undue delay.

Q What does the term “early nutrition” refer to?

A “Early nutrition” refers to the metabolic status of the unborn child and in the first two years after birth.

During pregnancy and the first few months of life, babies are entirely reliant on their mothers for their nutrition.

While still in the womb, babies are surrounded by the placenta, a specialized organ controlling the flow of vital nutrients from the maternal blood stream to the unborn child. Therefore, the nutrition reaching the foetus is dependent on the maternal nutrition, weight, and

overall health status. This reliance on the mother continues after birth when the mother’s milk and/or supplemental food including infant formula, will define the nutritional experience of a toddler.

“Early nutrition” therefore refers to this stage of life, when a child’s nutritional experience is largely defined by the mother.

QUESTIONS CONCERNING THE EARLY NUTRITION PROJECT

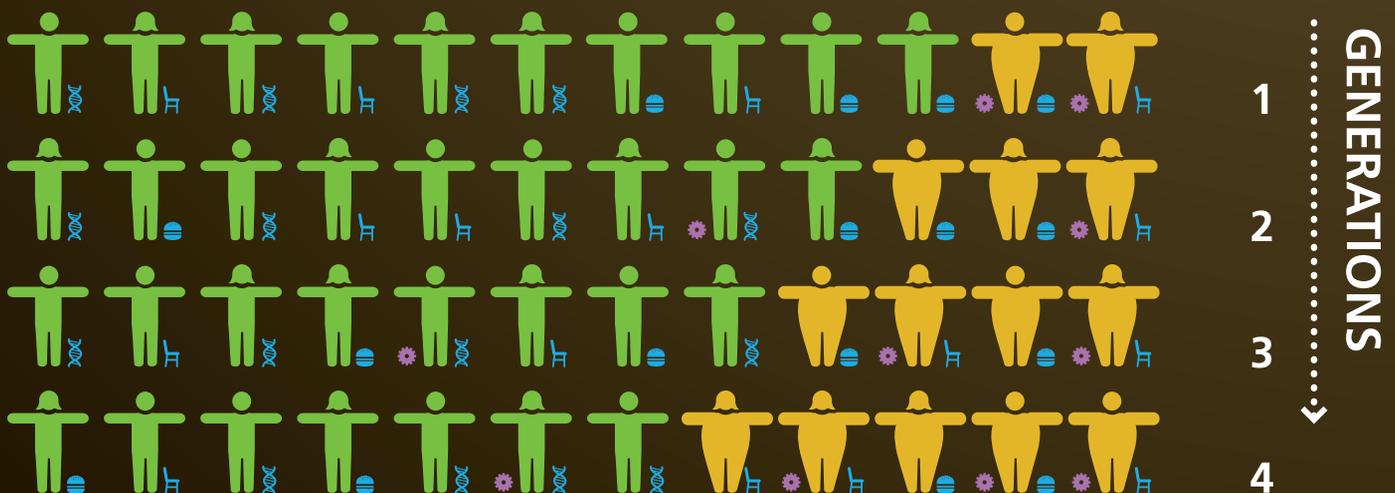
Q Why is obesity called a modern epidemic?

A The number of obese people in Europe has increased three-fold since the 1980s.⁴

The technical term “epidemic” refers to the spreading of a disease at unusually

high rates. Based on the latest estimates in countries of the EU, overweight affects up to 70% of the adult population while obesity affects 10-30% of adults.⁵ This sharp increase is the result of numerous factors including: a general shift in peo-

ple’s diets to high fat and high calorie containing foods, as well as a decrease in daily physical activity due to the progressively sedentary nature of many forms of work, changing modes of transportation, and growing urbanisation. These conveniences of the modern world are therefore influencing the increase in obesity and overweight worldwide.



Metabolic programming may be the key to understanding the epidemic dimension of obesity

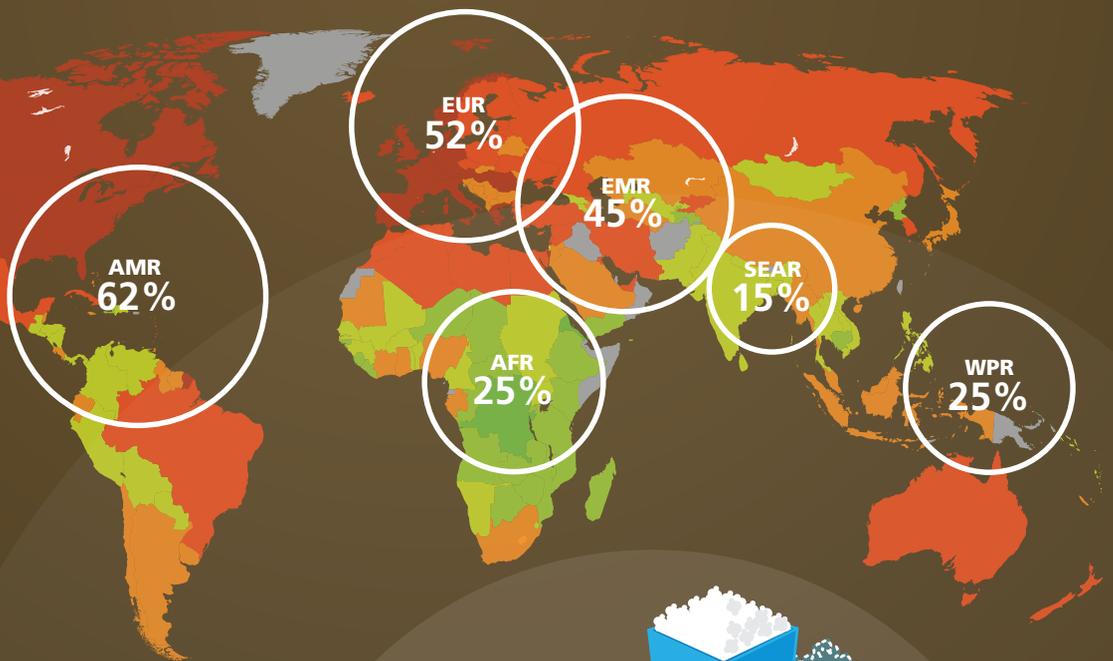
 higher risk due to other factors (diet, lifestyle, genetics)

 higher risk due to metabolic programming

Trans-Generational Metabolic Programming: In order to contribute to the explanation of the obesity epidemic researchers have postulated a trans-generational effect, i.e. a mechanism where health status of a parent can dispose their children towards overweight. Observational studies have confirmed that an unfavourable metabolic experience of an unborn can indeed dispose towards overweight in later life. Once established in the population, the risk of obesity may propagate from one generation to the next.

This is illustrated in the above figure, where obesity (yellow individuals) is spreading in a population with stable disposing factors towards overweight and obesity (blue icons). If in addition obese mothers predispose their children towards obesity (pink icons), this effect is sufficient to increase the number of obese individuals from one generation to the next.

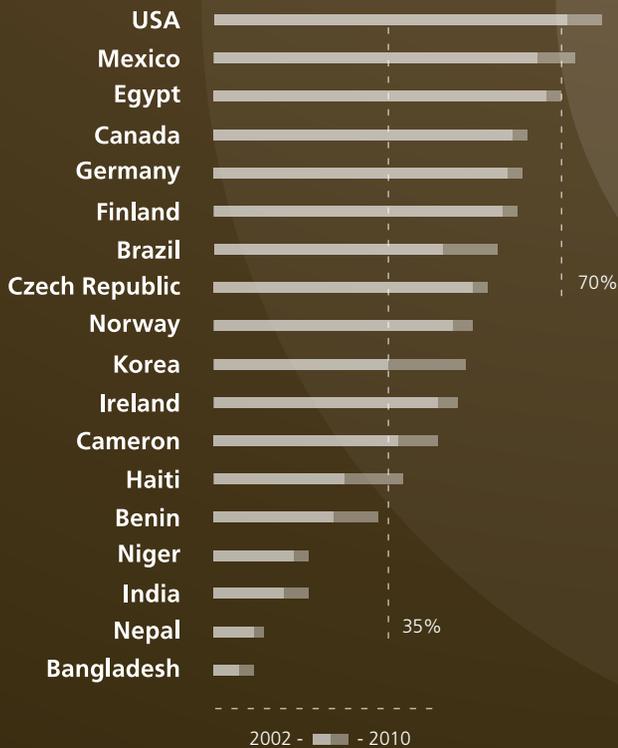
Average energy consumption⁹ (in calories/day)



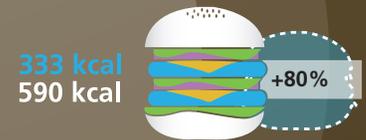
Overweight individuals in WHO regions¹⁰

AMR: Region of the Americas; EUR: European Region;
AFR: African Region; EMR: Eastern Mediterranean Region;
SEAR: South East Asian Region; WPR: Western Pacific Region.

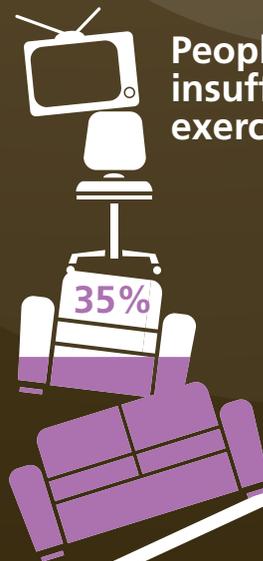
Average Overweight* Prevalence¹² (in % of the entire population)



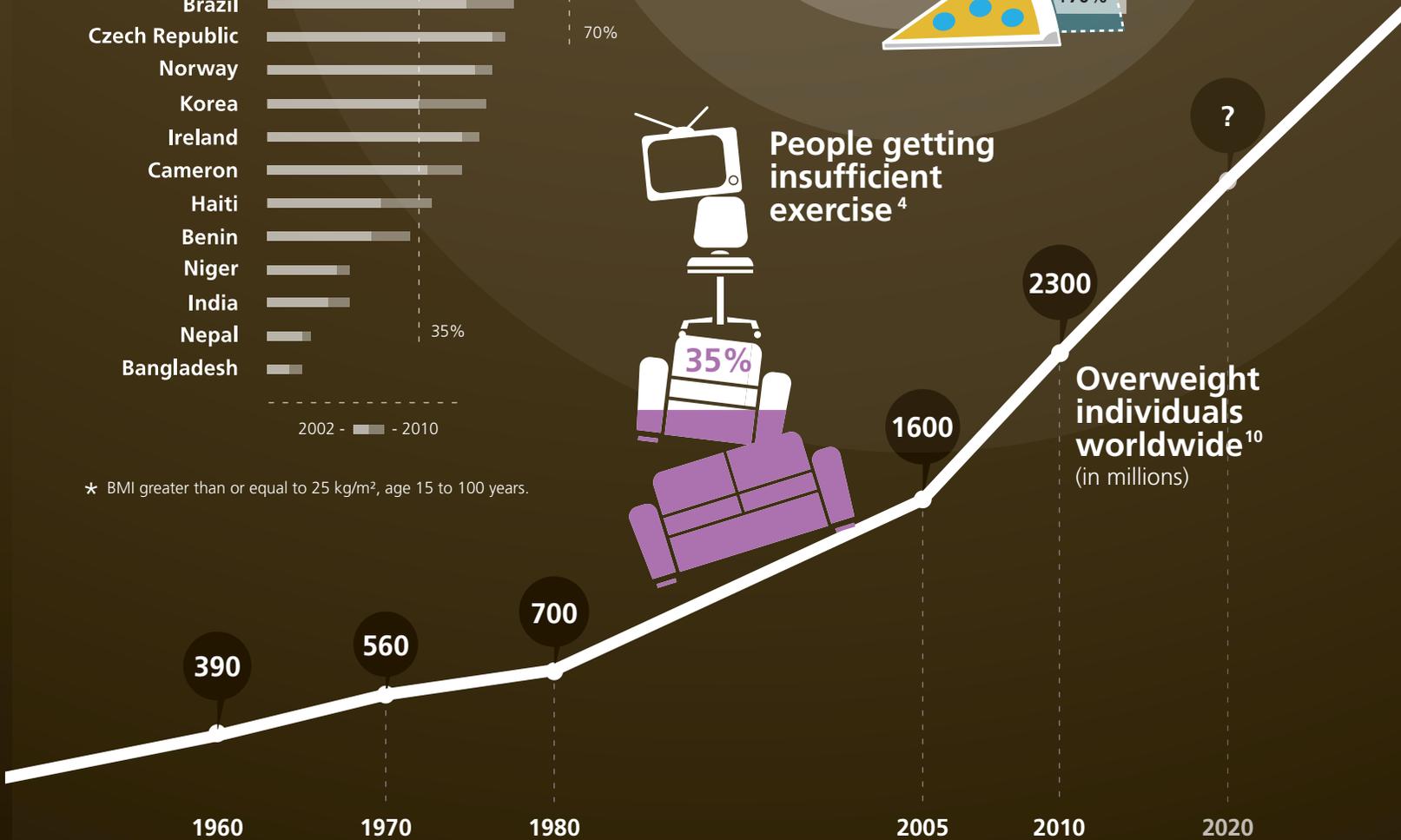
Increase of average serving size between 1990 / 2010¹¹



People getting insufficient exercise⁴



Overweight individuals worldwide¹⁰
(in millions)



* BMI greater than or equal to 25 kg/m², age 15 to 100 years.

Q What is obesity?

A Obesity is a medical term used to refer to excessive body fat.

The definition of obesity is based on an excessive amount of extra body fat; this

is also sometimes referred to as adiposity. A first estimate about the weight status of an individual is provided by the body mass index (BMI). A BMI between 18.5

and 25 is considered normal.³ The BMI is calculated by using a person's weight (kg) divided by their height in metres squared (m²). People with a BMI over 25 are considered overweight, while a value over 30 may constitute obesity.

Q What are the consequences of more people becoming obese?

A The growing prevalence of overweight and obese individuals is propagating an upsurge in many diseases leading to increased health care costs and a decrease in the quality of life of a significant proportion of the population.

The diseases associated with obesity include diabetes, high blood pressure, and the risk of other non-communicable diseases, often leading to premature death by stroke or heart attacks. Almost three million adults die each year as a result

of being overweight or obese. In addition, almost half of the diabetes burden, a quarter of the ischaemic heart disease burden, and between 7% and 41% of certain cancers are attributable to being overweight and obesity.⁶ According to the WHO, overweight and obesity are among the five leading causes of death globally, increasingly affecting people both in industrial and developing countries.

Obesity has a major impact on society and health care systems in addition to

the devastating effects on individuals. In 2010, the health care costs attributable to obesity were estimated to be between one and three per cent of the total health care costs in different European countries; In the United States, these costs can be as high as 10%.⁷ The incremental lost work days and costs of absenteeism due to high BMI was calculated to amount to a loss of up to three million productive person-years in working adults, representing an economic cost for Europe of up to €460 billion.⁷ environment to make a healthy life style an easy choice.

Q What are the consequences of more children becoming obese?

A Overweight and obese children not only experience an increased risk of the aforementioned diseases but also have, on average, a poorer quality of life.

Of particular societal concern is the increasing number of overweight children. It is estimated that over 60% of children who are overweight before puberty will be overweight in early adulthood.⁸ Globally, more than 40 million children under five were overweight in 2010.⁶ In Europe, 3 of 77

million children were obese in 2004.⁶ Estimates of overweight infants and children in the WHO European Region rose steadily from 1990 to 2008.⁶

The diseases associated with obesity are therefore increasingly affecting already young adults with enormous personal and societal consequences. Importantly, overweight at an early age coincides frequently with a negative self-image, academic underachievement, social isolation and a lower self-esteem, decreasing their overall

quality of life at an early age. Moreover, childhood obesity is a serious problem not only because it predisposes them to numerous childhood diseases but also to premature death.

EarlyNutrition will investigate factors and mechanisms of early nutrition and lifestyle programming during the four phases: pre-pregnancy, pregnancy, infants and children, in order to identify means to interfere with detrimental influence on child health.

Q What are the possible causes of obesity?

A The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended.

Globally, there has been an increased intake of energy-dense foods that are high in fat, salt and sugars but low in vitamins, minerals and other micronutrients.⁶ At the same time, there has also been a decrease in physical activity needed in many facets of daily life including work, recreational activities, and transportation.

Besides genetic predisposition and an unhealthy lifestyle, research has determined metabolic programming by early nutrition effects as a predisposing factor for obesity and, in particular, the increasing number of overweight children. In addition to steps that can be taken by individuals, research can contribute to tackling obesity on a societal scale.

The EarlyNutrition project is investigating three main hypotheses on the causes of overweight and obesity: 1) the fuel medi-

ated 'in utero' hypothesis, which asks the question if excessive intrauterine exposure to glucose and other fuels permanently affects foetal development and thereby increasing the risk of obesity in postnatal life; 2) the accelerated postnatal weight gain hypothesis, which asks if rapid weight gain during infancy increases the risks of becoming obese; and 3) the "mismatch hypothesis" which investigates if a sub-optimal perinatal and an obesogenic childhood environment predisposes children to obesity in their adult life.

Q What does the term "metabolic programming" refer to?

A Metabolic programming refers to the concept that the early nutritional and lifestyle experience of an individual leads to determinative programs in their health status later in life. In the context of the EarlyNutrition project, this term is investigated for the influence it has on predisposing individuals for overweight, obesity and related disorders.

Metabolic programming occurs by currently vaguely understood metabolic signals which are mediated by nutritional status at different stages of development. For example, studies show that obese mothers and those who put on excessive weight gain during pregnancy have a much higher chance of their children becoming overweight themselves than those mothers who do not. In addition, infants during

the first six months of life appear to be also susceptible to similar programming effects. The early nutrition pathways to programme obesity are likely to be multifactorial, but once established in the population, the risk of obesity may be able to propagate from one generation to the next.

Q Why should we tackle obesity at an early age already?

A Habits that are established early in life are notoriously difficult to change.

For this reason, early intervention activities are more likely to provide a successful and cost-effective solution to obesity. Therefore

parents and society are called upon to create a supportive environment, which favours healthy life styles to limit caloric intake and encourage physical activity.

CONTACT

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RESOURCES

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FIGURE DOWNLOAD

Page 4: www.project-earlynutrition.eu/pdf/download/EarlyNutrition_FAQ_graphic2_130812.eps

Page 5: www.project-earlynutrition.eu/pdf/download/EarlyNutrition_FAQ_graphic1_130812.eps

BMI table: www.project-earlynutrition.eu/pdf/download/EarlyNutrition_FAQ_graphic3_130812.eps

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