**OVERVIEW PROGRAMME**

**WEDNESDAY, 12 OCTOBER 2016**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>08:30 – 09:30</td>
<td>Walk-in and coffee</td>
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<tr>
<td>09:30 – 09:45</td>
<td>Welcome to Bonn (Ute Nöthlings, DE; Peter Stehle, Dean of the Faculty of Agriculture, University of Bonn, DE)</td>
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<tr>
<td>09:45 – 10:15</td>
<td>The past and the present of DEDIPAC: the benefits of multidisciplinary and international collaboration (Johannes Brug, NL)</td>
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<tr>
<td>10:15 – 10:45</td>
<td><strong>A1</strong>: Let the data speak! But what do they tell us? (Pieter van ’t Veer, NL)</td>
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<tr>
<td>10:45 – 11:15</td>
<td>Coffee</td>
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<tr>
<td>11:15 – 11:45</td>
<td><strong>A2</strong>: Reframing determinants in a multidisciplinary perspective and exploring new ways of analysing data across Europe (Nanna Lien, NO)</td>
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<tr>
<td>11:45 – 12:15</td>
<td><strong>A3</strong>: Evaluation and benchmarking of public health and policy interventions aimed at improving dietary, physical activity and sedentary behaviours across the life course: accomplishments and achievements during three years of DEDIPAC (Ilse De Bourdeaudhuij, BE)</td>
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<tr>
<td>12:15 – 13:30</td>
<td>Lunch</td>
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<tr>
<td>13:30 – 15:00</td>
<td>Breakout sessions I: Young researchers present</td>
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<tr>
<td>A4.1–A4.9:</td>
<td>Food Choice, nutrition, an eating behaviour: New data and conceptual frameworks within DEDIPAC (Chair: Britta Renner, DE)</td>
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<tr>
<td>A5.1–A5.8:</td>
<td>Population levels, determinants and policy interventions of physical activity in Europe – what we know and what we want to know (Chair: Ulf Ekelund, NO)</td>
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<td>A6.1–A6.9:</td>
<td>Sedentary behaviour in Europe: Time to take a stand? (Chair: Hidde van der Ploeg, NL)</td>
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<tr>
<td>15:00 – 15:30</td>
<td>Coffee</td>
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<tr>
<td>15:30 – 17:00</td>
<td>Breakout sessions II: Highlights of DEDIPAC</td>
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<tr>
<td>A7.1–A7.5:</td>
<td>Assessment of behaviours and determinants: present and future (Chair: Pieter van ’t Veer, NL)</td>
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<td>A8.1–A8.2:</td>
<td>Framing the determinants and putting them to the test (Chair: Nanna Lien, NO)</td>
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<tr>
<td>A9.1–A9.3:</td>
<td>Case studies, good practice policies and multicomponent interventions, and practical examples on how to use the TA 3 toolbox (Chair: Ilse De Bourdeaudhuij, BE)</td>
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<tr>
<td>From 18:00</td>
<td>Dinner and keynote speech</td>
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## OVERVIEW PROGRAMME

### THURSDAY, 13 OCTOBER 2016

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<tr>
<td>08:45 – 09:00</td>
<td>Walk-in and coffee</td>
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<tr>
<td>09:00 – 09:30</td>
<td>Building further on and with the Knowledge Hub - plenary session</td>
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<td>(Johannes Brug, NL)</td>
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<td>09:30 – 11:00</td>
<td>Breakout sessions III: Spin-offs</td>
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<td>Moving DEDIPAC ahead</td>
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<td>– visions of a DEDIPAC cohort</td>
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<td>(Chair: Wolfgang Ahrens, DE)</td>
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<td>Pooling existing determinant data: (not) the way ahead?</td>
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<td>(Chair: Jeroen Lakerveld, NL)</td>
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<td>“Policy made perfect”: A systems based approach to evaluating policy in physical activity</td>
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<td>and sedentary behaviour</td>
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<td>(Chair: Marie Murphy, UK)</td>
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<tr>
<td>11:00 – 11:30</td>
<td>Coffee</td>
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<tr>
<td>11:30 – 12:20</td>
<td>Forum discussion on future initiatives (Chair: Johannes Brug, NL)</td>
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<tr>
<td>12:20 – 12:30</td>
<td>Closing remarks and wrap-up (Johannes Brug, NL)</td>
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<tr>
<td>From 12:30</td>
<td>Lunch</td>
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A1  Let the data speak! But what do they tell us? – Key results from Thematic Area 1

Pieter van ‘t Veer¹, Lene Frost Andersen, Ulf Ekelund, Wolfgang Ahrens, Hidde van der Ploeg, Matthias Schulze, Alan Donnelly, Britta Renner, Ole Sprengeler, Marijn Stok, Thomas Kubiak, Antje Hebestreit, Barbara Thumann, Anouk Geelen

¹ Wageningen University, Division of Human Nutrition, Wageningen, the Netherlands

DEDIPAC Thematic Area 1 (TA1) addressed the methods to assess diet, physical activity (PA), sedentary behaviour (SB) and their determinants relevant to surveillance, research and prevention (in close collaboration with TA2).

TA1 reviewed and described the European diversity in PA&SB levels between countries, as well as their determinants. Traditional questionnaire-based measurement methods are increasingly complemented by objective measurements. Dietary surveys at the pan-EU level largely use short-term methods, with food safety and nutritional adequacy as their main objectives. TA1 reviewed methods to assess nutrient intake, public health relevant behaviours such as intake of sugar-sweetened beverages (SSBs) and fruits and vegetables, as well as overall dietary and meal patterns, and PA and SB behaviours. Demographic determinants of these behaviours (e.g. age, sex, social class) could be used in secondary data analysis, but pooling of individual-level determinants was hampered by lack of standardization.

DEDIPAC developed a toolbox of assessment methods by target group, describing their feasibility, reliability and validity. Current methods usually aim at time-integrated levels of exposure and cannot explain the intra-individual variation by changeful determinants in daily life. Thus, TA1 explored innovative methods to objectively and simultaneously assess determinants and behaviours (e.g. for SSBs) and for pan-European surveillance.

Trustworthy evidence-based public health policies require validated, cost-effective and objective assessment methods. Currently, there is a lack of consolidated knowledge regarding individual-level determinants because appropriate methods to assess these in a pan-European context are lacking. There is a need for better instruments to assess dietary patterns, energy intake, PA&SB. To tackle the public health challenges this calls for validation and calibration studies embedded in a new generation of surveillance, cohort studies and interventions.

A2  Reframing determinants in a multidisciplinary perspective and exploring existing data across Europe

Nanna Lien¹, Mario Mazzocchi, Jeroen Lakerveld, Donal O’Gorman on behalf of the TA2 partners

¹ University of Oslo, Department of Nutrition, Oslo, Norway

Dietary behaviour, physical activity and sedentary behaviour are important determinants of health and are themselves determined by an interaction between biological, psychological, sociological, economic, ecological, and socio-economic factors. The European diversity in these factors provides a unique opportunity to study the relationship among these determinants and with dietary behaviour, physical activity and sedentary behaviours. However, there is a need for assembling current knowledge across disciplines and to consider new methods to analyse such complex interactions of influences. Such knowledge is needed to comprehensively understand the complex relationships as a basis to select the right targets for actions at multiple levels from the individual to the global to ensure that the “healthy choice is the easy choice”

Multidisciplinary frameworks of determinants for each of the behaviours were developed through a systematic process incorporating both, evidence from the literature and expert opinions. The expert opinions were first elicited within DEDIPAC and thereafter by external experts through workshops or
online surveys. The frameworks were developed for three age groups, and there were separate ones for ethnic minority groups.

A compendium of 114 unique datasets which could potentially be used for secondary data analyses were compiled within DEDIPAC. Based on the frameworks and gaps identified by these, secondary data analysis were conducted either on single studies, as federated meta-analysis or by pooling of data from several studies.

Five multidisciplinary frameworks have been developed identifying gaps and guiding future research, and approximately 20 secondary data analysis have been or are being conducted contributing to new ways of thinking and analysing determinants.

**A3** Evaluation and benchmarking of public health and policy interventions aimed at improving dietary, physical activity and sedentary behaviours across the life course: accomplishments and achievements during three years of DEDIPAC

Ilse De Bourdeaudhuij

Ghent University, Department of Movement and Sport Sciences, Watersportlaan 2, 9000 Ghent, Belgium

This presentation will focus on the accomplishments and achievements that were reached during the last three years of DEDIPAC within Thematic Area 3. The goal of Thematic Area 3 was the evaluation and benchmarking of public health and policy interventions aimed at improving dietary, physical activity and sedentary behaviours across the life course. A first line of research focused on good practice policies and health promotion interventions. The review will be presented on the definition and the characteristics of these good practices. In addition, the inventory and database of the good practices in the 11 DEDIPAC countries will be shown. A second line of research focused on implementation conditions for interventions and policies. Many interventions/policies are developed by universities or institutes but are not continued in the real-life setting. The review on the implementation conditions for diet and physical activity interventions and policies will be presented. In addition case studies will be highlighted showing how these implementation conditions are used in 5 DEDIPAC countries. A third line of research was the development of the DEDIPAC Knowledge Hub PAN-European Toolbox for Development, Evaluation and Implementation of policies and multicomponent interventions. The different parts of the toolbox will be shown. Finally, the results of the testing of the toolbox within 13 natural experiments in DEDIPAC countries will be explained.

**A4.1** Dietary behaviour: Developing a taxonomy of outcomes related to diet, eating and nutrition

Marijn Stok, Britta Renner, all DEDIPAC WP 2.1 partners

University of Konstanz, Dept. of Psychology, Konstanz, Germany

“Dietary behaviour” is a multidisciplinary object of research. Intriguingly, “dietary behaviour” is a fuzzy umbrella term that can mean and represent quite different things across disciplines and researchers, hindering communication, understanding and comparison. In order to better understand the diversity and scale of dietary behaviour research, the current study involved drawing up a taxonomy of the different outcomes studied by a diverse and broad group of scholars investigating dietary behaviour. A four-phase interactive Delphi method was conducted with 65 scholars involved the DEDIPAC project. Phase 1 consisted of an online mind mapping procedure. In Phase 2, the input was reduced and categorized into a taxonomy. In Step 3, this taxonomy was discussed among all scholars involved and adapted. In Step 4, the taxonomy was finalized. More than 100 outcomes were initially specified, at
various levels of detail and with myriad relations being indicated between the different outcomes. The final taxonomy that was agreed upon consists of 3 main categories (Eating Behaviour, Food Choice, and Dietary Intake/Nutrition) and 17 specific outcomes. The term “dietary behaviour” covers a wide range of outcomes. Awareness and understanding of this diversity are prerequisites for successful cross-disciplinary eating and obesity research. The current taxonomy can be used as a tool to facilitate discussion and understanding between researchers from different disciplines investigating diet and dietary behaviour.

A4.2 Methods of exploratory dietary patterns applied in pan-European studies: A systematic review
Franziska Jannasch¹, Fiona Riordan, Lene Frost Andersen, Matthias B Schulze

¹ Department of Molecular Epidemiology, German Institute of Human Nutrition Potsdam-Rehbruecke, Nuthetal, Germany

Diet is a rather complex construct and dietary pattern approaches were developed to overcome the limitations of examining single food items. This review aims to comprehensively identify and describe methodological details of all existing exploratory statistical approaches to derive dietary patterns applied in pan-European studies. Subsequently the identified state-of-the-art methods will be included in a DEDIPAC-wide toolbox, which will guide the choice of methods in relation to study type and life course. The literature search was conducted using three databases PUBMED, Web of Science and EMBASE, and screening was carried out by two independent researchers. The search resulted in seven pan-European studies, which were rated with good to high quality, and assessed dietary patterns in children (n=1), adolescents (n=1), adults (n=3) and elderly (n=2). In terms of methodology: a) five studies applied factor analysis or principal component analysis (PCA), while two studies applied cluster analysis, b) the number of food items from dietary assessment instruments ranged from 18 to 51 food groups, c) four of the five studies which used factor analysis or PCA, retained factors according to the three criteria eigenvalue >1, scree plot and interpretability, while one study decided upon the maximum variance in the food groups explained by the derived factor. In one study applying cluster analysis k-means clustering method was used, whereas the other study first used the hierarchical Ward’s method and then used k-means clustering to fine-tune cluster solutions. In conclusion, the predominant approach applied in pan-European studies was factor analysis or PCA, but details of this method, for example, food grouping and the criteria used to retain factors differed widely. Therefore, it is necessary to overcome existing problems of comparability and applicability by standardizing food intake measurements and harmonizing details of pattern methods in future pan-European projects.

A4.3 Determinants of Food Decision Making: A Systematic Interdisciplinary Mapping (SIM) Review
Claudia Symmank¹², Robert Mai, Stefan Hoffmann, Marijn Stok, Britta Renner, Nanna Lien, Harald Rohm

¹ Chair of Food Engineering, Technische Universität Dresden, Dresden, Germany
² Department of Marketing, Kiel University, Kiel, Germany

The number of publications on consumer food decision making and its determinants has been steadily increasing over the last three decades. Given that different scientific disciplines deal with this topic from different perspectives, it is necessary to develop an interdisciplinary overview. The aim of this study was to conduct a systematic interdisciplinary mapping (SIM) review by combing rapid and mapping techniques to explore the state-of-the-art, and to identify hot topics and research gaps in this
field. An extensive literature search resulted in 1,820 publications from 485 different journals and other types of publication from ten disciplines (including nutritional science, medicine/health science, behavioral science, food technology, biology, psychology, social psychology, sociology, marketing/consumer research, and business administration/economics) across a period of 60 years. The determinants of food decision making are categorized in line with the recently proposed DONE (Determinants Of Nutrition and Eating behavior) framework within the DEDIPAC knowledge hub. In sum, the paper analyzes a dataset with 2,996 entries. The distribution of the publications published from 1954 to 2014 indicates that research interest was low for almost four decades. Starting with 1990, a steady increase in publication number is noticeable, with currently almost 200 publications per year. Most research is conducted in medicine/health and nutritional science, followed by behavioral science and food technology. Although there are some linkages across neighboring disciplines (e.g., behavioral and nutritional science), only few publications address multiple research disciplines, indicating a lack of interdisciplinary research. The majority of studies investigate biological, psychological and product-related determinants, whereas policy-related influences on consumer’s food choice are scarcely researched. This study is the first to systematically review quantitative studies in the field of food decision making across different disciplines. The paper calls for interdisciplinary research and makes suggestions on how to fill the identified voids.

A4.4 Individual determinants of dietary intake in community-dwelling older adults – a DEDIPAC study

Eva Kiesswetter¹, Anna Saba, Fiorella Sinesio, Angela Polito, Elisabetta Moneta, Donatella Ciarapica, Silvia Migliaccio, Lorenzo M Donini, Eleonora Poggiogalle, Aleksandra Suwalska, Katarzyna Wieczorkowska-Tobis, Wiktor Palys, Dorota Łojko, Claire Sulmont-Rossé, Catherine Feart, Johannes Brug, Dorothee Volkert¹

¹ Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute for Biomedicine of Aging, Nuremberg, Germany

Nutrition is a main contributor to health, well-being and quality of life. However, dietary intake of older adults can be compromised by various individual factors. This systematic literature review aims to compile the current knowledge on functional, psychological and social-cultural determinants of dietary intake in community-dwelling older adults (≥65 years). A systematic literature search was conducted in Pubmed, Web of Science, Scopus and Cochrane Library. Titles, abstracts, and full texts were screened by two independent reviewers according to predefined in- and exclusion criteria. Studies examining functional (physical, oral, chemosensory, and cognitive function), psychological (mood, personality) and/or social-cultural (socioeconomic status, marital status, living situation) determinants in combination with intake of energy and nutrients, food intake, dietary pattern or dietary quality were included. The quality of studies was evaluated according to the criteria for primary research papers from a variety of fields. The search identified 22,772 papers of which 45 were included. Eighty-eight percent of the included studies had a cross-sectional design. For most of the functional and psychological determinants only few studies with heterogeneous methods were found. Regarding social-cultural determinants several studies showed an association between level of education and dietary intake. Regarding income, marital status and living conditions the results were less consistent and partly depend on gender. The quality scores ranges between 0.23 and 1, whereby 1 implicates the highest quality. In summary, regarding functional and psychological determinants of dietary intake in older adults research gaps were identified. Moreover, due to the study design no causal relationships between determinants and outcomes could be derived. Consequently, future studies with a longitudinal design investigating the influence of individual determinants of dietary intake in older adults are needed.
A4.5  Seasonality of food groups and total energy intake: a systematic review and meta-analysis

Marta Stelmach-Mardas, Christina Kleiser, Irina Uzhova, José Luis Peñalvo, Giuseppe La Torre, Wiktor Palys, Dorota Lojko, Katharina Nimptsch, Aleksandra Suwalska, Jakob Linseisen, Rosella Saurle, Vittoria Colamesta, Heiner Boeing

The aim of this systematic review and meta-analysis was to assess the effect of season on food intake from selected food groups and on energy intake in adults. The search process was based on selecting publications listed in the following: Medline, Scopus, Web of Science, Embase and Agris. Food frequency questionnaires, 24-h dietary recalls and food records as methods for assessment of dietary intake were used to assess changes in the consumption of 11 food groups and of energy intake across seasons. A meta-analysis was performed.

Twenty-six studies were included. Articles were divided into those reporting data on four seasons (winter, spring, summer and autumn) or on two seasons (pre- and post-harvest). Four of the studies could be utilized for meta-analysis describing changes in food consumption across four season scheme: from winter to spring fruits decreased (SMD: -0.12, 95% CI: -0.16, -0.08), whereas vegetables (SMD: 0.11; 95% CI: 0.03, 0.19), eggs (SMD: 0.06; 95% CI: 0.01, 0.11) and alcoholic beverages (SMD: 0.17, 95% CI: 0.07, 0.27) increased; from spring to summer vegetable consumption further increased (SMD: 0.18, 95% CI: 0.03, 0.33) and cereals decreased (-0.05; 95% CI: -0.07, -0.02); from summer to autumn fruits (SMD: 0.16; 95% CI: 0.05, 0.27) and cereals (SMD: 0.09 95% CI: 0.06, 0.12) increased and vegetables (SMD: -0.26, 95% CI: -0.47, -0.05), meat (SMD: -0.02; 95% CI: -0.05, 0.0), eggs (SMD: -0.10; 95% CI: -0.17, -0.03) and alcoholic beverages (SMD: -0.18; 95% CI: -0.27, -0.09) decreased; from autumn to winter cereals (SMD: -0.07; 95% CI: -0.10, -0.05) decreased.

A significant association was also found between energy intake and season, for 13 studies reporting energy intake across four seasons and for eight studies across pre- and post-harvest seasons (favors post-harvest) (SMD: 0.43; 95% CI: 0.28, 0.57).

In conclusions, the winter or the post-harvest season is associated with increased energy intake. The intake of fruits, vegetables, eggs, meat, cereals and alcoholic beverages is following a seasonal consumption pattern and at least for these foods season is determinant of intake.

A4.6  Associations of Breakfast Skipping with diet quality and overweight/obese European adolescents, a Secondary Analysis of the Healthy Lifestyle by Nutrition in Adolescence (HELENA) dataset: a DEDIPAC study

Nora Barrett, Fiona Riordan, Nathalie Michels, Lene Frost Anderson, Pieter van ’t Veer, Luis Moreno, Kurt Widhalm, Yannis Manios, Frederic Gottrand, Alba Santaliestra-Pasias, Jonatan Ruiz, Laura Censi Stefaan de Henauw, Mathilde Kersting, Brug, Janas M Harrington

Obesity is a multifaceted global public health problem. It is hypothesised that unhealthy meal patterns are likely contributing factors. In particular, skipping breakfast has been shown to be associated increased risk of overweight/obesity.

This analysis aimed to explore the associations between breakfast skipping (BS) and diet quality (DQ) and to determine the association between BS and overweight/obesity among participants of the cross sectional Healthy Lifestyle in Europe by Nutrition in Adolescence Study (HELENA). Participants (n=1804) were classified as breakfast skippers (BS)=525; breakfast consumers (BC)=946; no
classification (NC)=333). Assessment of diet quality was based on a previously described HELENA diet quality index (DQI).

The majority of participants were breakfast consumers (64%) compared to breakfast skippers (36%). A higher proportion of skippers were female compared to males (39% vs 32% respectively). Describing the association between BS and DQ, significant differences in median DQI were found; BC (males and females) had a higher median DQI compared to BS (p<0.001). Significant differences were also found in macronutrient profiles between BC and BS (p<0.05). In relation to BMI, compared to BC, BS had a greater mean (sd) BMI (Males: 21.8 (3.6) vs. 20.1 (3.2); females: (21.2(3.3) vs. 20.5(3.3)). In fully adjusted multivariate analysis, BS was significantly associated with BMI [0.74 (0.55, 0.98)]. Stratification by gender attenuated the effect in females while increased odds of overweight/obesity remained for male BS [2.87(1.76, 4.67)] compared to BC.

Targeted interventions are needed to address the global public health problem of overweight/obesity. Understanding the diet and lifestyle patterns contributing to this public health problem is essential. Based on these results, skipping breakfast has a negative impact on diet quality in European adolescents and also suggest that gender may be a key aspect of BS, therefore, breakfast skipping interventions may benefit if they are designed to be gender specific.

A4.7 Socioeconomic Indicators Are Independently Associated with Nutrient Intake in French Adults: A DEDIPAC Study

Wendy Si Hassen¹, Katia Castetbon, Philippe Cardon, Christophe Enaux, Mary Nicolaou, Nanna Lien, Laura Terragni, Michelle Holdsworth, Karien Stronks, Serge Hercberg, Caroline Méjean and on behalf of the DEDIPAC consortium

¹ Centre de Recherche en Épidémiologies et Biostatistiques Sorbonne Paris Cité, Nutritional Epidemiology Research Team, Université Paris 13, Bobigny, France

Studies have suggested differential associations of specific indicators of socioeconomic position (SEP) with nutrient intake and a cumulative effect of these indicators on diet. We investigated the independent association of SEP indicators (education, income, occupation) with nutrient intake and their effect modification. This cross-sectional analysis included 91,900 French adults from the NutriNet-Santé cohort. Nutrient intake was estimated using three 24-h records. We investigated associations between the three SEP factors and nutrient intake using sex-stratified analysis of covariance, adjusted for age and energy intake, and associations between income and nutrient intake stratified by education and occupation. Low educated participants had higher protein and cholesterol intakes and lower fibre, vitamin C and beta-carotene intakes. Low income individuals had higher complex carbohydrate intakes, and lower magnesium, potassium, folate and vitamin C intakes. Intakes of vitamin D and alcohol were lower in low occupation individuals. Higher income was associated with higher intakes of fibre, protein, magnesium, potassium, beta-carotene, and folate among low educated persons only, highlighting effect modification. Lower SEP, particularly low education, was associated with lower intakes of nutrients required for a healthy diet. Each SEP indicator was associated with specific differences in nutrient intake suggesting that they underpin different social processes. As nutritional interventions in at risk populations is a key element of public health policies, their implementation could be improved by a better knowledge of the socioeconomic indicators at stake for differences in nutrient intakes between individuals.
A4.8 Impact of the French soda tax on soft drink purchases

Sara Capacci¹, Olivier Allais, Celine Bonnet, Mario Mazzocchi

¹ University of Bologna, Department of Economics, Bologna, Italy

On 1 January 2012 the French government has introduced a tax on drinks with added sugar or sweeteners. We provide a first ex-post evaluation of the effects of the tax, by exploiting quasi-experimental evaluation methods. The policy intervention can be seen as a natural experiment, as we compare data on drink purchases prior and after the introduction of the tax in two French regions subject to the tax (the treatment group, Provence-Alpes-Cote-d’Azur and Rhone-Alpes) with similar data for two neighbouring Italian regions (the control group, Piemonte-Val D’Aosta and Liguria). We use home scan GkF-Kantar data on household purchases, combined with a selection of socio-demographic determinants to match households in the treatment and control group. Our research aims to estimate the effects of the tax on the following: (a) prices actually paid by the households; (b) consumption levels and substitution patterns for different drinks; (c) consumer preferences, intended as the demanded quantities after controlling for price effects.

A4.9 Why do people drink soft drinks? – New evidence based on an integrated ambulatory assessment in the DEDIPAC KH project

Mario Wenzel¹, Nicolai Andre Lund-Blix, Anouk Geelen, Lene Frost Andersen, Pieter van ’t Veer, Kristof Van Laerhoven und Thomas Kubiak

¹ Johannes Gutenberg University Mainz, Health Psychology, Mainz, Germany

The consumption of sugar-sweetened beverages (SSB) plays an important role in the genesis of overweight and obesity. The adverse effects are explained by the high energy content (quickly absorbed carbohydrates) as well as by the low satiety. SSB consumption varies substantially between individuals and several person-specific factors have been discussed (e.g., socio-economic status, social norms). By means of a multidisciplinary approach, the DEDIPAC KH project aims to contribute to improving the understanding of determinants of dietary, physical activity and sedentary behaviours (Lakerveld et al., 2014). Research using ecologically valid methods to study processes in situ is relatively scarce. The aim of this feasibility pilot is, thus, (a) to develop an innovative integrated method to assess those variables and (b) to test this method in three European countries. 70 to 90 participants, who were or are currently recruited in Mainz, Bremen, Oslo, and Wageningen, completed six times per day for one week a questionnaire on the momentary capacity of self-control resources, mood, social norms, and access to consumer electronics using the Android-based app myHealthAssistant. Key components of the integrated method are the assessment directly in daily life using modern technology (experience sampling, GPS localization, barcode scanning, accelerometry). Consumed drinks are assessed subjectively by selecting the drink from a list and scanning the barcode afterwards.

Data will be analysed with multilevel analysis and cross-level mediation models. Particular challenges of the integrated smartphone based assessment are the accuracy of the GPS localization, the reactivity and the trade-off between the reliability of the measures and the burden for the participants.
A5.1 The “What, Why and How” of Measurement of Physical Activity and Sedentary Behaviours

Kieran Dowd, Robert Szeklicki, Marco Alessandro Minetto, Marie H Murphy, Sarahjane Belton, Sebastien Chastin, Ben Stansfield, Philippa Dall, Angela Polito, Ezio Ghigo, Hidde van der Ploeg, Ulf Ekelund, Ingrid Hendriksen, Janusz Maciaszek, Rafal Stemplewski, Maciej Tomczak, Alan Donnelly

Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland and the Department of Life and Physical Sciences, Athlone Institute of Technology, Athlone, Ireland

The links between increased participation in Physical Activity (PA) and improvements in health are well established, while a growing body of evidence has highlighted the negative health consequences of excessive Sedentary Behaviour (SB). As the body of evidence for the associations between PA, SB and health have grown, so too has the search for PA and SB measures with high levels of methodological effectiveness (i.e. validity, reliability and responsiveness to change). High levels of methodological effectiveness are essential for 1) the accurate surveillance of the prevalence and determinants of PA and SB, 2) the evaluation of the effectiveness of PA and SB interventions and 3) strengthening the associations between PA and/or SB and health. By conducting four systematic reviews, we have aimed to comprehensively review and compare the methodological effectiveness of currently employed measures of PA and SB to aid researchers in their selection of an appropriate tool. The methodological effectiveness of self-report measures of PA and SB have been most frequently examined, with high levels of variability identified for both criterion and concurrent validity and for reliability across a broad range of behaviours. The evidence-base for the methodological effectiveness of objective monitors, particularly accelerometers/activity monitors, is increasing, with lower levels of variability observed for both validity and reliability when compared to subjective measures. Unfortunately, responsiveness to change across all measures and behaviours remains under-researched, with limited information available.

Other criteria beyond methodological effectiveness often influence tool selection, including cost and feasibility. However, researchers must be aware of the methodological effectiveness of any measure selected for use when examining PA and SB. Although no “perfect” tool for the examination of PA and SB exists, it is suggested that researchers aim to incorporate appropriate objective measures, specific to the behaviours of interests, when examining PA and SB in free-living environments.

A5.2 Variation in objectively measured physical activity and sedentary behaviors across European youth – harmonized analyses of over 39,000 children and adolescents

Jostein Steene-Johannessen, Bjørge Herman Hansen, Hidde van der Ploeg, Sigmund Alfred Anderssen, Ulf Ekelund

Kristiania University College, Oslo; Norway; Norwegian School of Sport Sciences; Oslo, Norway

The variation in population levels physical activity and sedentary behaviour across European youth is substantial, however much of variation is likely depending on data reduction methods and accelerometer intensity thresholds used (Loyen et al. 2016). Thus, there is a requirement for improved harmonisation strategies in PA surveillance in order to describe the variation in physical activity behaviour by place and person among European youth. The International Children’s Accelerometry Database (ICAD) is a project that aims to meet this requirement and is in fact developing standardized methods to create comparable outcome variables. However, additional large scale PAN European studies using objectively measured physical activity not currently included in ICAD might be available.
We therefore did a systematic review, searching six databases (PubMed, PsycINFO, Embase, Web of Science, Sport Discus, and Scopus) to identify PAN-European and national data sets on physical activity and sedentary time assessed by accelerometry in youth (<18 years). We have included raw Actigraph data files and accompanying anthropometric data from 26 different studies (10 already included in ICAD) representing a total of 39,655 youths (2-18 years) from 18 different European countries.

We will re-analyse all individual physical activity data using standard techniques and compare absolute activity level, intensity specific physical activity and adherence to the physical activity guidelines activity levels between countries and or regions. Finally, we will describe the variation in relation to age, gender and weight status.

To date no study has incorporated such amount of harmonized individual physical activity data from a diverse range of European countries. Findings will inform researchers and policymakers with accurate data on physical activity behaviour across Europe and can be used to explore trends and to reach target populations.

A5.3 Variation in population levels of physical activity in European children and adolescents according to cross-European studies: a systematic literature review within DEDIPAC

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Regular physical activity is associated with physical, social and mental health benefits, whilst insufficient physical activity is associated with several negative health outcomes (e.g. metabolic problems). Population monitoring of physical activity is important to gain insight into prevalence of compliance to physical activity recommendations, groups at risk and changes in physical activity patterns. This review aims to provide an overview of all existing studies that measure physical activity in youth, in cross-European studies, to describe the variation in population levels of physical activity and to describe and define challenges regarding assessment methods that are used. A systematic search was performed on six databases and supplemental forward- and backward tracking was done. Journal articles or reports that reported levels of physical activity in the general population of youth from cross-European studies were included. This review revealed large differences between countries in prevalence of compliance to physical activity recommendations (i.e. 60 min of daily moderate- to vigorous-intensity physical activity (MVPA)) measured subjectively (5–47 %) and accelerometer measured minutes of MVPA (23–200 min). Overall boys and children were more active than girls and adolescents. Different measurement methods (subjective n = 12, objective n = 18) and reported outcome variables (n = 17) were used in the included articles. Different accelerometer intensity thresholds used to define MVPA resulted in substantial differences in MVPA between studies conducted in the same countries when assessed objectively. Reported levels of physical activity and prevalence of compliance to physical activity recommendations in youth showed large variation across European countries. This may reflect true variation in physical activity as well as variation in assessment methods and reported outcome variables. Standardization across Europe, of methods to assess physical activity in youth and reported outcome variables is warranted, preferably moving towards a pan-European surveillance system combining objective and self-report methods.
**A5.4 Determinants of physical activity across the life course: a “Determinants of Diet and Physical Activity” (DEDIPAC) umbrella systematic literature review series**

Anna Puggina\(^1\), Katina Aleksovska, Angela Carlin, Giancarlo Condello, Cristina Cortis, Lina Jaeschke, Aileen Kennedy, Ciaran Mac Donncha, Laura Capranica, Stefania Boccia on behalf of the DEDIPAC consortium

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Physical activity (PA) is a health-enhancing behavior: when practiced regularly, it reduces the risks for a range of non-communicable diseases (NCDs) and its promotion is becoming a priority in current public health policies. Within the DEterminants of DIet and Physical ACtivity Knowledge Hub (DEDIPAC-KH), one objective is to identify key determinants that promote or hinder PA behaviors with the final aim to translate this knowledge into more effective health promotion strategies.

An online systematic search on MEDLINE, ISI Web of Science, Scopus and SPORTDiscus databases has been conducted considering eligible systematic literature reviews (SLRs) and meta-analyses (MAs) of observational studies published in English language from 2004 to 2016. Data extraction considered the relevance of the determinants, the strength of evidence and the methodological quality. The results were summarized on seven different umbrella reviews on biological, psychological, behavioral, physical, socio-cultural, economic, and policy determinants of PA, respectively.

From the systematic search, 17,941 studies were retrieved. After duplicates removal, 15,147 studies were screened through evaluation of the title, abstract and full text. Then, 63 studies were considered eligible and included in the umbrella SLRs. In particular, 18 publications were included in the biological umbrella SLR, whereas the relative picture for the psychological, behavioral, physical, socio-cultural, economic, and policy umbrella SLRs was 20, 17, 28, 22, 18 and 14 publications, respectively.

The considerable scientific production on PA signifies its relevance in health-enhancing policies of western societies. Based on a multidisciplinary and inter-sectorial approach, the seven umbrella SLRs provide an exhaustive understanding of the determinants of PA behaviors and could be a valuable basis for the development of effective approaches and strategies to enhance active lifestyles of European citizens.

**A5.5 Psychological determinants of physical activity across the life course: a DEDIPAC umbrella systematic literature review**

Cristina Cortis\(^1\), Anna Puggina, Katina Aleksovska, Christoph Buck, Con Burns, Greet Cardon, Angela Carlin, Chantal Simon, Donatella Ciarapica, Marco Colotto, Giancarlo Condello, Tara Coppinger, Sara D’Haese, Marieke De Craemer, Andrea Di Blasio, Sylvia Hansen, Licia Iacoviello, Johann Issartel, Pascal Izzicupo, Lina Jaeschke, Martina Kanning, Aileen Kennedy, Fiona Ling, Agnes Luzak, Giorgio Napolitano, Julie-Anne Nazare, Grainne O’Donoghue, Camille Perchoux, Caterina Pesce, Tobias Pischon, Angela Polito, Alessandra Sannella, Holger Schulz, Rhoda Sohun, Astrid Steinbrecher, Wolfgang Schlicht, Ciaran Mac Donncha, Laura Capranica, Stefania Boccia on behalf of the DEDIPAC consortium

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Low levels of physical activity (PA) are reported to contribute to the occurrence of non-communicable diseases over the life course. Despite of the large number of studies and reviews available, the knowledge on the psychological determinants of PA is still inconclusive. Therefore, the aim of this umbrella review was to summarise and synthesise the scientific evidence on psychological correlates and determinants of PA behaviour across the life course. A systematic online search was conducted...
on MEDLINE, ISI Web of Science, Scopus and SPORTDiscus databases. The search was limited to studies published in English language from January, 2004 to April, 2016. Systematic literature reviews (SLRs) and meta-analyses (MAs) of observational studies that investigated the association between psychological determinants of PA were considered eligible. The extracted data were assessed based on the importance of the determinants, the strength of evidence and the methodological quality. The full protocol is available from PROSPERO (PROSPERO 2014:CRD42015010616). Twenty reviews, mostly of moderate methodological quality, were eligible for this umbrella SLR. Self-efficacy was the only determinant showing positive convincing evidence in children and adolescents, whereas no convincing evidence emerged in adult population. Regardless of age, probable evidence emerged for perceived competence, motivation, intention and personality traits. Most of the evidence of the association between psychological determinants and PA is probable or limited, due to the lack of definition of PA, differences of the results among reviews, and the low quality of the individual studies. Further research is needed, preferably by using prospective study designs, standardized definitions of PA and objective measurement methods of PA assessment.

A5.6 Physical determinants of physical activity across the life course: a DEDIPAC umbrella systematic literature review

Angela Carlin1, Anna Puggina, Camille Perchoux, Katina Aleksovska, Christoph Buck, Con Burns, Greet Cardon, Simon Chantal, Donatella Ciarpica, Marco Colotto, Giancarlo Condello, Tara Coppinger, Cristina Cortis, Sara D’Haese, Marieke De Craemer, Andrea Di Blasio, Sylvia Hansen, Licia Iacoviello, Johann Issartel, Pascal Izzicupo, Lina Jaeschke, Martina Kanning, Aileen Kennedy, Jeroen Lakerveld, Fiona Ling, Agnes Luzak, Giorgio Napolitano, Julie-Anne Nazare, Tobias Pischon, Angela Polito, Alessandra Sannella, Holger Schulz, Rhoda Sohun, Astrid Steinbrecher, Wolfgang Schlicht, Ciaran Mac Donncha, Laura Capranica, Stefania Boccia on behalf of the DEDIPAC consortium

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Participation in regular physical activity (PA) is associated with a multitude of health benefits across the lifecycle. Despite this, many people are failing to meet current PA recommendations. A plethora of reviews and studies exist however the evidence base regarding the physical determinants of PA remains inconclusive. The objective of this umbrella systematic literature review (SLR) is to identify the physical determinants that influence PA across the lifecycle. An online systematic literature search was conducted using MEDLINE, ISI Web of Science, Scopus and SPORTDiscus. The search was limited to studies published in English (January 2004 to April 2016). SLRs and meta-analyses (MAs) of observational studies that investigated the association between physical determinants and PA outcomes across all stages of the life course were eligible for inclusion. The extracted data were assessed on the importance of determinants, strength of evidence and methodological quality. The literature search identified 28 SLRs and 3 MAs on 91 physical determinants of PA that were eligible for inclusion in this SLR. Among preschool children, a probable association was reported between access/proximity to parks, playgrounds and open space, and overall PA. The availability of equipment within schools, and neighbourhood features, for example, pedestrian/cyclist safety structures and walkability were positively associated with PA in children and adolescents, however evidence was limited. Residential location and environment features were associated with PA in adults however inconsistent associations were reported for the majority of reviewed determinants. In conclusion, this umbrella SLR provided a comprehensive overview of the physical determinants of PA across the life course. The limited evidence available from longitudinal studies, coupled with the diverse methodologies and definitions employed across studies makes it difficult to draw firm conclusions. It is vital that researchers make a concerted effort to employ harmonised, objective methodologies in the future measurement of PA and its determinants.
A5.7 Behavioral determinants of physical activity across the life course: a DEDIPAC umbrella systematic literature review

Giancarlo Condello¹, Anna Puggina, Katina Alekssovska, Christoph Buck, Con Burns, Greet Cardon, Angela Carlin, Simon Chantal, Donatella Ciarapica, Marco Colotto, Tara Coppinger, Cristina Cortis, Sara D’Haese, Marieke De Craemer, Andrea Di Blasio, Sylvia Hansen, Licia Iacoviello, Johann Issartel, Pascal Izzicupo, Lina Jaeschke, Martina Kanning, Aileen Kennedy, Fiona Ling, Agnes Luzak, Giorgio Napolitano, Julie-Anne Nazare, Grainne O’Donoghue, Camille Perchoux, Caterina Pesce, Tobias Pischon, Angela Polito, Alessandra Sannella, Holger Schulz, Rhoda Sohun, Astrid Steinbrecher, Wolfgang Schlicht, Ciaran Mac Donncha, Laura Capranica, Stefania Bocca on behalf of the DEDIPAC consortium

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Low levels of physical activity (PA) are a current global concern and increasing PA engagement is becoming a priority in current public health policies. Despite the large number of studies and reviews available, the evidence regarding the behavioral determinants of PA is still inconclusive. Thus, the aim of this umbrella systematic literature review (SLR) was to summarize the evidence on the behavioral determinants of PA across the life course. A systematic online search was conducted on MEDLINE, ISI Web of Science, Scopus and SPORTDiscus databases. The search was limited to studies published in English language from January, 2004 to April, 2016. SLRs and meta-analyses (MAs) of observational studies that investigated the behavioral determinants of PA were considered eligible. The extracted data were assessed based on the importance of the determinants, the strength of evidence, and the methodological quality. The full protocol is available from PROSPERO (PROSPERO 2014:CRD42015010616). Seventeen reviews on 35 behavioral determinants of PA were eligible for this umbrella SLR. Regardless of age, the most investigated determinants were those related with ‘screen’ and ‘smoking’. For youth population, ‘previous PA’ was the only determinant showing a convincing positive evidence in children, whilst probable positive evidence emerged for ‘independent mobility and active transport’ in children and adolescents. For adult population, ‘transition to university’ and ‘pregnancy status’ showed probable negative associations. Even if the majority of the evidence was limited and most of the determinants were not associated with PA, due to the lack of definition of PA, this umbrella SLR provided a comprehensive overview of the associations between behavioral determinants and PA. However, further research is needed, preferably by using prospective study designs, standardized definitions of PA and objective measurement methods of PA assessment.

A5.8 Relations of Physical Activity and Sedentary Behaviour with Mental Health Outcomes and Relevant Biomarkers

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This project will examine associations between physical activity (PA), sedentary behaviour (SB), and mental health across large pan-European samples. Anxiety and depression remain prevalent among European adults. Though evidence supports the benefits of PA for anxiety and depression, the role of SB and potential mediators/moderators remain understudied in large-scale population-based investigations. By harmonising targeted variables across four large datasets, this study will benefit from enhanced statistical power and generalizability and more refined subgroup analysis.

Eighteen potentially relevant datasets from the DEDIPAC compendium of datasets were identified, with five relevant datasets secured. Creation of an integrated dataset is ongoing: variables that are measured the same way across datasets are pooled; where variables do not perfectly align, variables are generated based on consensus. For example, based on self-reported or objectively-measured
PA, participants were classified into low (meeting PA guidelines 0-2 d/wk), moderate (3-4 d), and high (5-7 d) PA levels. Additionally, more complex harmonisation techniques including statistical transformations (e.g., T-score generation), will also be employed. Associations of PA and SB with mental health outcomes (and reciprocal relations), and more complex interactions with selected mediators/moderators will be analyzed with regression and structural equation modeling.

Harmonisation of 47 relevant variables collected among 16,729 European adults (55.6% female; 63.85±9.92 y) included in the TILDA, Mitchelstown, HOORN, and CCLaS datasets is ongoing. 30.4%, 34.7%, and 33.9% of participants engaged in low, moderate, and high PA, respectively. 26.5% (n=4,437) of participants reported probable depression (CES-D\(\geq\)8). 18.1% (n=2,621) reported scores indicative of elevated anxiety (HADS-A\(\geq\)8). Further harmonisation and analysis are ongoing.

Despite potential difficulties in variable alignment across datasets, applying harmonisation methodologies to existing datasets for novel secondary analysis offers unprecedented opportunities to both quantify relations between PA, SB, and mental health and explore plausible modifiable mediators/moderators in a large European sample.

A6.1 Variation in population levels of sedentary time in European adults according to cross-European studies: a systematic literature review within DEDIPAC

Anne Loyen, Maïté Verloigne, Linde Van Hecke, Ingrid Hendriksen, Jeroen Lakerveld, Jostein Steene-Johannessen, Annemarie Koster, Alan Donnelly, Ulf Ekelund, Benedicte Deforche, Ilse De Bourdeaudhuij, Johannes Brug, Hidde P van der Ploeg, on behalf of the DEDIPAC consortium

Sedentary behaviour is increasingly recognized as a public health risk that needs to be monitored at the population level. Across Europe, there is increasing interest in assessing population levels of sedentary time. This systematic literature review aims to provide an overview of all existing cross-European studies that measure sedentary time in adults, to describe the variation in population levels across these studies and to discuss the impact of assessment methods. Six literature databases were searched, supplemented with backward- and forward tracking and searching authors’ and experts’ literature databases. Articles were included if they reported on observational studies measuring any form of sedentary time in adults in two or more European countries. Each record was reviewed, extracted and assessed by two independent researchers, and disagreements were resolved by a third researcher. Of the 9,756 unique articles that were identified in the search, twelve articles were eligible for inclusion in this review, reporting on six individual studies and three Eurobarometer surveys. These studies represented 2 to 29 countries, and 321 to 65,790 participants. The majority of studies used questionnaires to assess sedentary time, while two studies used accelerometers. Total sedentary time was reported most frequently and varied from 150 to 620 minutes per day across studies and countries. One third of European countries were not included in any of the studies. Objective measures of European adults are currently limited, and most studies used single-item self-reported questions without assessing sedentary behaviour types or domains. Findings varied substantially between studies, meaning that population levels of sedentary time in European adults are currently unknown. In general, people living in northern Europe countries appear to report more sedentary time than southern Europeans. The findings of this review highlight the need for standardisation of the measurement methods and the added value of cross-European surveillance of sedentary behaviour.
A6.2 Assessment of sedentary behaviour and its determinants in children and adolescents for surveillance purposes – first results of a feasibility study

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There is a lack of standardised methods for the comprehensive assessment of sedentary behaviour (SB) and its determinants in young people for use in pan-European surveillance systems. Based on existing instruments and experts’ opinions, we developed a novel instrument for the subjective assessment of SB and its determinants.

The instrument was combined with the activPAL device for the objective assessment of SB and evaluated in Bremen, Berlin, Limerick and Dublin in 7-8 year old children and 14-15 year old adolescents using a school-based protocol (June 2015 to May 2016). Information was reported by a parent for children and self-reported by adolescents. Feasibility was determined based on response proportion, quality and completeness of data provided, participant feedback and resources needed using data from Bremen (other data were not available at the time of analysis).

Of 325 individuals approached, 124 (38%) participated. Although 85% answered the items related to SB, some items were not completely understood. Average wearing time of the activPAL was 7 days and nearly 24 hours/day as intended. Participants needed on average 29 minutes to complete the questionnaire. Nearly 26% perceived the completion time as long. Only 6% perceived wearing the activPAL as stressful. Distribution, recollection and data processing of the activPAL devices were time consuming.

Overall, the novel instrument proved to be feasible for surveillance purposes. Nevertheless, strategies for increasing participation are warranted. The questionnaire needs to be shortened and comprehensibility of particular items to be improved. In a next step, the questions assessing SB will be validated against activPAL data which will provide further insights in the suitability of the instrument. We consider the activPAL a suitable device for measuring SB for surveillance purposes. However, the cost of devices, coupled with the time required for data download, management and analysis must be considered prior to implementation.

A6.3 The validity and reliability of methods to assess key determinants of physical activity and sedentary behavior

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Little is known about the determining factors of physical activity (PA) and sedentary behaviour (SB) in children and adolescents. In order to develop effective prevention and intervention studies, key determinants of activity behaviour have to be assessed accurately. Further, harmonized assessment of key determinants of PA and SB enabling comparability between studies is lacking. Aim of the study was to inform the research community about available and evaluated methods in order to assess harmonized data and allow comparability of potential key determinants. Publications reporting psychometric properties of methods assessing key determinants of PA and SB in children and adolescents were identified in two steps. 1) Based on already existing Systematic Literature Reviews (SLR) we identified literature on key determinants of PA and SB. 2) We then evaluated the listed methods for data collection in order to extract validated methods assessing the key determinants in children and adolescents identified previously in WP 1.2.
We identified three SLRs providing a total number of 15 different key determinants of PA and SB in children and adolescents. Until now, validated instruments have been identified for 11 key determinants of PA and SB in this age group. Large variance in the psychometric properties of the methods assessing key determinants was observed and will be described in detail. We conclude that stronger evaluation of methods assessing determinants of PA and SB in children and adolescents is required in future studies. Further, researchers should apply those validated methods in order to provide harmonized data and allow comparability in determinant research.

### A6.4 Bayesian Network Analysis of Factors Influencing Physical Activity and Sedentary Behaviour based on the Eurobarometer

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The DEDIPAC Knowledge Hub conducted systematic reviews of factors influencing sedentary behaviours (SB) across life stages and established the Systems Of Sedentary behaviour (SOS) framework to facilitate a system-based approach for research on determinants of SB. Investigating determinants of SB usually ignores the potential complex associations among the factors themselves. In the present analysis, a Bayesian network approach was therefore considered as a novel approach to investigate the structure of potential interdependencies between factors associated with SB in line with the SOS-framework. The analysis was based on data of the Eurobarometer 80.2 from 2013 which included questions on self-reported physical activity (PA) time, sitting time and demographic, environmental, health, or psychosocial information. By adding data on macro-level factors from Eurostat database, 33 variables from five systems were considered on individual or regional level: 1) physical health and well-being, 2) social and cultural context, 3) built and natural environment, 4) psychology and behaviour, 5) institutional and home settings. Overall, 22,978 (82.3%) participants of the Eurobarometer from 28 European countries, aged 16 and older, who provided complete information, were considered. The sample was subdivided into eight strata based on male, female categories and four age-categories, i.e. young (16–25), adults (26–44), middle aged (45–64), and older adults (65+), to account for sex differences over the life course. Bayesian networks (BN) were applied to the overall study sample as well as to each sex- and age-stratum that allowed the complex modelling of conditional interdependencies between variables in terms of a directed acyclic graph (DAG). As a main finding, SB was mainly directly or indirectly associated with occupational status and perceived social class for the three youngest age groups in both, men and women. In older adults, SB was associated with physical activity via sports club membership in women and men.

### A6.5 A systematic review of determinants of sedentary behaviour in youth: a DEDIPAC study

Annabel Sandra Mueller-Stierlin¹, Sara De Lepeleere, Greet Cardon, Patricia Dargent-Molina, Belinda Hoffmann, Marie H Murphy, Aileen Kennedy, Grainne O'Donoghue, Sebastien FM Chastin, Marieke De Craemer

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Sedentary behaviour (SB) has emerged as a potential risk factor for metabolic health in youth. Knowledge on the determinants of SB in youth is necessary to inform future intervention development to reduce SB. A systematic review was conducted to identify predictors and determinants of SB in youth. Pubmed, Embase, CINAHL, PsycINFO and Web of Science were searched, limiting to articles in English, published between January 2000 and May 2014. The search strategy was based on four
key elements and their synonyms: (a) sedentary behaviour, (b) determinants, (c) types of sedentary behaviours, (d) types of determinants. The full protocol is available from PROSPERO (2014:CRD42014009823). Cross-sectional studies were excluded. The analysis was guided by the socio-ecological model. 37 studies were selected out of 2654 identified papers from the systematic literature search. The study quality, using the Qualyst tool, was high with a median of 82% (IQR: 74–91%). Determinants were found at the individual, interpersonal, environmental and policy level but few studies examined a comprehensive set of factors at different levels of influences. Evidence was found for age being positively associated with total SB, and weight status and baseline assessment of screen time being positively associated with screen time (at follow-up). A higher playground density and a higher availability of play and sports equipment at school were consistently related to an increased total SB, although these consistent findings come from single studies. Evidence was also reported for the presence of safe places to cross roads and lengthening morning and lunch breaks being associated with less total SB. Future interventions to decrease SB levels should especially target children with overweight and should start at a young age. However, since the relationship of many determinants with SB remains inconsistent, there is still a need for more longitudinal research on determinants of SB in youth.

A6.6 Cross-sectional and longitudinal relationships of macro-environmental factors with physical activity and sedentary behaviour: moderating effects of gender, age, education and occupation

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Few studies have examined macro-level environmental determinants of physical activity and sedentary behavior. The current study aimed to examine the cross-sectional and longitudinal relationships of regional-level population density (as an indicator of urbanization) and GDP with Europeans’ total physical activity and sedentary behavior. Additionally, we examined whether these relationships were moderated by gender, age, education and occupation.

We analyzed data from the Special Eurobarometer 183.6 (2002), 246 (2005) and 412 (2013) complemented with regional-level data on population density and GDP from the Eurostat database. Generalized linear mixed models were applied to examine the (cross-sectional and longitudinal) relationships of population density and GDP with MVPA, walking and sedentary behavior.

Data from 65,686 Europeans, 30 different countries and 305 regions were analyzed. Several moderating effects were observed and cross-sectional and longitudinal findings differed. Higher density was cross-sectionally related to lower volumes of MVPA and more sitting among retirees. Longitudinally, increases in density related to higher volumes of walking among participants younger than 25 and older than 65 years and those with less than 15 years of education. Increases in density also decreased sitting time among men, white collars, the self-employed and retirees. In regions with higher GDP, higher odds of MVPA and walking were observed among higher SES groups. Participants living in regions with higher GDP had higher levels of sitting time, except for those aged 65 and older, manual workers and the self-employed. Longitudinally, increases in GPD related to higher volumes of MVPA, but not among housepersons, the unemployed and retirees. Among students, increases in GDP were related to decreases in sedentary behavior.

Economic development appears to benefit the health of the wealthiest but not the most vulnerable Europeans. Our findings highlight the importance of studying interactions between individual and macro-environmental characteristics and of longitudinal studies when aiming for causal inferences.
A6.7 Gaps and new candidate determinants of sedentary behaviour in youth: a DEDIPAC-study

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Recently, the Systems Of Sedentary behaviours (SOS) framework was developed and provides a transdisciplinary model of the complexity of the web of factors that influence sedentary behaviour through the life course. During the development of the SOS framework, important gaps in the literature on determinants of sedentary behaviour emerged. On the one hand, new candidates came out of the framework which are potential determinants of sedentary behaviour that have never been investigated before. On the other hand, several other factors came out of the framework for which there currently is insufficient evidence. Therefore, there is a need to investigate whether and how these factors are associated with sedentary behaviour. Making use of secondary data analyses, these potential new candidate determinants were tested in youth. The selection of potential correlates that were investigated was based on the final list of life course factors from the SOS-framework. In addition, datasets were selected based on the following criteria: (1) datasets including children (3-12 years old) and/or adolescents (13-18 years old), (2) sedentary behaviour was measured either objectively (e.g., by means of accelerometers) or subjectively (either self- or proxy-reported), and (3) correlates and/or determinants of sedentary behaviour were investigated in the dataset. In total, seven potential correlates of sedentary behaviour were studied in two or more of five included datasets: (1) ethnicity, (2) car ownership, (3) sleep, (4) smoking, (5) alcohol, (6) perceived health status and (7) perceived weight status. Further, it was decided to use self-reported television and computer time as sedentary behaviours, as these data were available in every study. Finally, the data from the five studies were pooled and harmonized in order to perform secondary analyses on the pooled dataset. At the moment, datasets are collected and harmonised and still need to be analysed.

A6.8 Guideline for the piggyback evaluation of cost-effectiveness in multi-component interventions in the field of diet, physical activity and sedentary behaviour

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Economic evaluations of multi-component interventions in the field of diet, physical activity and sedentary behavior are very rare. However, information on the cost-effectiveness of those interventions is frequently requested, especially due to limited financial resources. Therefore, so-called “piggyback” evaluations are recommended, which are economic analyses that are planned and conducted alongside (“piggybacked”) the outcome evaluation of an intervention. The aim of this guideline is firstly to encourage researchers to include economic aspects in the planning of their evaluation study and secondly to facilitate the process of collecting the required health economic data alongside the trial and subsequently to perform the specific calculations and report the outcomes. This guideline includes a detailed description of the four necessary steps as well as a costing template and a syntax file for SPSS in order to ensure that the addressed researchers, who may not be experienced in economics, can conduct a piggyback economic evaluation by themselves.

Four steps are recommended to conduct a piggyback economic analysis. First, the preparation of the study protocol includes clear definitions and descriptions of the study perspective, the target population, the setting, the time frame, the comparators (the alternative to the intervention), and the outcome measures. Second, the detailed collection of costs includes all costs related to the routine application of the intervention, dependent on the chosen perspective. The costing template included in the piggyback-guideline lists several kinds of cost items that have to be considered. Third, analyzing
the data using the incremental cost-effectiveness ratio is explained and includes a syntax file for SPSS as well as information about the interpretation of the results. Fourth, the accurate reporting of the results is specified and should follow the recommended health-economic guideline.

A6.9 Systematic review of sedentary behaviors and their correlates among adults: a socio-ecological approach

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Sedentary behaviour is associated with adverse cardio-metabolic consequences even among those considered sufficiently physically active. In order to successfully develop interventions, factors that influence sedentariness need to be identified and fully understood. The aim of this review is to identify individual, social, environmental, and policy-related determinants or correlates of sedentary behaviours among adults aged 18–65 years. PubMed, Embase, CINAHL, PsycINFO and Web of Science were searched for articles published between January 2000 and September 2015. The search strategy was based on four key elements and their synonyms: (a) sedentary behaviour (b) correlates (c) types of sedentary behaviours (d) types of correlates. Articles were included if information relating to sedentary behaviour in adults (18–65 years) was reported. 74 original studies were identified out of 4041: 71 observational, two qualitative and one experimental study. Sedentary behaviour was primarily measured as self-reported screen leisure time and total sitting time. In 15 studies, objectively measured total sedentary time was reported. Individual level factors such as age, physical activity levels, body mass index, socio-economic status and mood were all significantly correlated with sedentariness. A trend towards increased amounts of leisure screen time was identified in those married or cohabiting while having children resulted in less total sitting time. Several environmental correlates were identified including proximity of green space, neighbourhood walkability and safety and weather. Results provide further evidence relating to several already recognised individual level factors and preliminary evidence relating to social and environmental factors that should be further investigated. Most studies relied upon cross-sectional design limiting causal inference and the heterogeneity of the sedentary measures prevented direct comparison of findings. Future research necessitates longitudinal study designs, exploration of policy-related factors, further exploration of environmental factors, analysis of inter-relationships between identified factors and better classification of sedentary behaviour domains.

A7.1 TA1 toolbox on assessing diet

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Aim of the WP related to diet was to develop the DEDIPAC toolbox of state-of-the-art methods to assess dietary intake, dietary behaviour and their determinants, based on their quality and suitability to be used in pan-European studies, guiding the choice of methods in relation to study type (surveillance, determinant research, intervention) and life course (infants and children, adolescents, adults, older adults). The tasks has been planned to be fulfilled with four specific subtasks related to: 1) systematic literature reviews (SLR) of assessment methods related to dietary intake and dietary patterns, 2) reviews on the validity of assessment methods identified in SLRs as well as of determinants of dietary

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intake/behaviour identified in WP2.1 and 3) incorporation of information into a toolbox (open access and web-based).

Several SLRs have been completed by different groups involved in this WP related to specific dietary exposures covering different dimensions of dietary intake/behaviour (2 reviews on single foods [SSB, F&V], 2 reviews on nutrients (fiber, folate & vit B12), 3 reviews on meal patterns, 2 reviews on dietary patterns). Review groups have collected information on assessment methods specific for dietary dimension according to uniform data collection forms which form the basis for data of the toolbox. These data are complemented with assessment method details for core determinants of diet identified in work of TA2. Together, the data will go into the web-based diet toolbox, which IT infrastructure is currently (status July 2016) being developed.

A7.2 The DEDIPAC TA1 Toolbox; measurement of physical activity and sedentary behaviour and their determinants

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The accurate measurement of Physical Activity (PA) and Sedentary Behaviour (SB) has relevance for both refining our understanding of the determinants of PA and SB and defining the dose-response relationship between the volume, duration, intensity and pattern of PA and SB and the associated health impact. As part of the DEDIPAC work packages on PA and SB, we have completed 4 systematic literature reviews, which present all available information from 700 original methods papers on the validity, reliability and sensitivity of methods for measurement of PA and SB in both youth and adults. The purpose of the toolbox is to provide an intuitive system for researchers to assist in the identification of the most appropriate method for their research. The toolbox will allow the user to scroll through menus describing each measurement method, linked to detailed reporting of the method’s validity, reliability and sensitivity. The opening menu will allow the user to select age group (youth or adults) and measurement of PA or SB. Users will then select the measurement type (i.e. self-report, heart rate monitor, pedometer etc.). The validity, reliability and responsiveness to change for each method are reported, and each will be hyperlinked to graphical displays summarising method validity. In addition, a parallel set of pages will allow the user to scroll through a list of key determinants for PA and SB, with links to studies which have examined the validity of measurement methods for each determinant. Overall, this section of the DEDIPAC toolbox will allow the user to make an informed selection of research methods for both the measurement of PA and SB, and the assessment of the determinants for those behaviours. The toolbox will provide an easily accessible authoritative source, supported by a substantial research database, creating a significant resource for researchers.

A7.3 Innovative methods for assessing diet, physical activity and sedentary behaviour

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To develop and evaluate pan-European public health nutrition and physical activity strategies, Europe needs to overcome the current diversity in non-harmonised methods to assess dietary, physical activity and sedentary behaviours and their determinants. TA1 has identified the state-of-the-art methods to separately assess these behaviours in a pan-European perspective. All these methods have their pros and cons according to the quality of data obtained and the feasibility of use in large sample and across borders.
What are the future innovative methods for assessing diet, physical activity and sedentary behaviours in a pan-European setting? Rapidly evolving innovations in information and communications technologies (ICT) may significantly contribute to novel assessment methodologies for all three behavioural domains.

The innovations on dietary assessment are basically following two lines; 1) old methods are wrapped into new technology like web-based FFQs, and mobile-phone diaries and 24 hr recalls, and 2) distinct new methods like integrations of different methods/technologies in one or new biomarkers of intake are developed.

We aim to provide an overview of today’s innovation with most focus on the field of dietary assessment methodology. Are the innovative initiatives superior to the state-of-the art methods according to quality and feasibility? Are the promising new approaches using ICTs realistic for use in a Pan-European perspective? Moreover, the possibilities for the integration of several methods in one approach to get a more overall picture of the three behaviours together will be touched upon. And lastly some of the challenges using ICTs e.g. technical and ethical issues will be highlighted.

A7.4 Sedentary behaviours and physical activity in adults – A European perspective

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Physical inactivity and sedentary behaviours are risk factors for the development of a range of non-communicable disease, including cardiovascular disease, diabetes and some forms of cancer. Monitoring population levels of physical inactivity and sedentary behaviours is needed to track temporal population trends, to identify high risk populations and to evaluate population wide public health initiatives. One of the aims of the DEDIPAC Knowledge Hub is to enable standardised and continuous cross-European surveillance of physical activity and sedentary behaviours. This presentation will focus on the work done within DEDIPAC over the past few years that focussed on population surveillance of physical activity and sedentary behaviours. Findings from DEDIPAC systematic literature reviews on population surveillance of both physical activity and sedentary behaviours will be presented. Results will also be presented from the recent pooling of accelerometer data from population based studies from England, Norway, Portugal and Sweden. The focus of the finding will not only focus on between country differences in population levels of physical activity and sedentary behaviours, but also on methodological limitations which limit between country comparisons as well as studying temporal population trends. Finally, the need for better standardisation and harmonisation for population surveillance across Europe, and the link to determinants of these behaviours will be discussed.

A7.5 Pan-EU surveillance on diet, physical activity and sedentary behaviour: Where are the gaps and how can they be overcome?

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In 2014, an inventory of surveillance systems in Europe assessing dietary intake, dietary behaviour, physical activity (PA) and/or sedentary behaviour (SB) was compiled to identify gaps and needs and to contribute to a roadmap towards a future harmonised pan-European surveillance system on diet, PA,
SB and their key determinants. The inventory contains six international and forty-four national surveillance systems. However, each of the international systems has its own limitations with regard to the dimensions covered and the age groups included. In general, dietary intake and PA are most often assessed and adults are the predominant target population. Therefore, it was agreed upon that the roadmap should focus on children (including infants) and adolescents as the target population of a future harmonised pan-European surveillance system.

A panel of experts representing the most promising international and national surveillance systems was established to agree on recommendations for the roadmap. A future harmonised pan-European surveillance system should build on already existing surveillance systems rather than establishing a completely new system. The following main steps were suggested for the roadmap: 1) development of an overall conceptual framework for a harmonised pan-European surveillance system including questions to be addressed, rationale for the areas of interest and summary of overall strategy, 2) selection of indicators at the individual- and setting-level for the different health behaviours of interest and their determinants, 3) identification of established/validated instruments for measuring the indicators, 4) conducting a methodological study to calibrate the currently used instruments with a short set of common items. Depending on steps 1) to 4), subsequent steps may entail the 5) establishment of a methodological competence centre to support further harmonisation of existing systems, 6) creation of cross-links to research and 7) exploration of fund raising strategies for the further development and maintenance of a harmonised pan-European surveillance system.

A8.1 Bridging disciplines and research traditions: Conceptual frameworks for three different behaviours - nutrition and eating; physical activity, sedentary behaviour

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There is a growing interest and need for a multidisciplinary approach to investigate determinants of dietary behaviours and physical activity throughout the life course in order to prevent non-communicable diseases and social inequalities in health. The aim of task 1 in Thematic area 2 of the DEDIPAC Knowledge Hub was thus to develop dynamic and evolving frameworks for determinants of dietary, physical activity and sedentary behaviours across the life course and to discuss their future use.

System-based frameworks of determinants of dietary, physical activity and sedentary behaviours were systematically developed within 3 separate work packages in TA2 of DEDIPAC, while a forth work package addressed determinants of these behaviours in ethnic minority groups. The protocols for developing the frameworks followed the same steps across the work packages; 1) Preparation of criteria and protocol; 2) Generation of a list of factors based on eminence and evidence overall involving a multi-disciplinary team of experts. 3) Seeking consensus on sorting and structuring these factors into emerging clusters; and 4) Interpreting and utilising the framework for research and interventions. Researchers within DEDIPAC and external experts contributed to the process. The results on determinants of these behaviours in ethnic minority groups were subsequently integrated into the three other frameworks, as well as maintained as two separate frameworks (diet and physical activity/sedentary behaviour).

Frameworks for dietary behaviours, physical activity, sedentary behaviour in the general population and ethnic minority were developed along with lists of priorities for research.
The frameworks are designed to be open and interactive in nature. They can be used to guide research into the factors underlying the three behaviours. Their success depends on their application and further development by the research community.

A8.2 Secondary Data Analysis - Overview, Process and Outcomes

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A key DEDIPAC challenge was to make better use of existing databases and establish and maintain an integrated multidisciplinary database of relevant studies that have used state-of-the-art methodologies. In this context the following task was defined within DEDIPAC and was consistent across all WPs in TA2: Explorative secondary data analysis and development of a framework of determinants of diet, physical activity and sedentary behaviour.

Two main approaches to exploiting existing data evolved: A) Federated meta-analyses of study specific data analysis with a minimum of harmonisation and B) secondary analysis of a single data set or harmonisation of a number of datasets. The following steps were broadly followed within each approach: 1) identification of relevant datasets, 2) development of a compendium, 3) clarification of key topics and approaches for analyses, 4) gaining access to datasets, 5) pooling and harmonising the data and 6) data analysis and manuscript writing.

A compendium of 114 relevant datasets was developed. The potential of existing data, gaps identified in the frameworks and individual/group interests informed the research questions. The federated meta-analysis within WP related to diet addressed: sleep and beverage intake; meal patterns and energy/macronutrient intake over the day; and trends in number of meals per day with increasing age. Across WPs related to physical activity and sedentary behaviour about 10 research questions were addressed. For instance, Bayesian analyses were applied to explore linkages between clusters of determinants of physical activity and sedentary behaviour, and the harmonisation of 47 relevant demographic, physical activity, and mental health variables was done to examine relations of physical activity with mental health outcomes.

Varying potential exists by applying secondary data and harmonisation methodologies to existing dataset to further understand the drivers of dietary, physical activity and sedentary behaviour. The potential greatly depended on the availability, accessibility and comparability of relevant data, as well as the analytical approaches used.

A9.1 Database of good practice policies and multicomponent interventions

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Efficient health promotion is important for future public health and well-being in Europe. To implement health promotion activities, it is important to identify and exchange successful and effective policies and interventions across Europe. We developed a web-based database with good practice (GP) public
policies and interventions in the field of nutrition and physical activity to transfer the knowledge of GP interventions and public policies. In DEDIPAC a GP intervention or policy was defined as well-described, evidence based, feasible and transferable. All three criteria need to be fulfilled to be classified as a GP. We developed a questionnaire based on this definition. Participating member states identified interventions or policies in their country that would fulfill this definition. The owners of the GPs were contacted through an online questionnaire containing questions related to the core characteristics of a GP. In addition, we developed an assessment framework to assess the quality of the available data for each GP. We identified 83 potential GP interventions and policies. We received information of 43 GPs from 8 countries. We identified 8 policies and 35 interventions. Complete information was available for 20 GPs. Most GPs aimed at children, and combined information on diet and physical activity. This database contains useful information of a series of GP interventions and policies in the field of diet and physical activity. This will help to transfer (elements of) GPs across Europe.

A9.2 Practical examples on how to use the TA3 toolbox with the use of case studies

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Within Thematic Area 3, a toolbox was developed which can be used to develop, monitor and evaluate policies and multicomponent interventions. The toolbox can be divided into three main parts: (1) development, (2) evaluation, and (3) implementation. Within these three parts in the toolbox, different subsections can be found, for example: templates for the description of policies and multicomponent interventions, an inventory of standardised measures to evaluate changes in determinants, behaviours, physical and mental health indicators, the economical evaluation of policies and multicomponent interventions, and more information about process evaluation measures and measures to evaluate the reach, effectiveness, adoption, implementation and maintenance (RE-AIM). Although the toolbox is a useful instrument for the development, evaluation and implementation of policies and multicomponent interventions, it is not always clear for the toolbox-users how this instrument can be used in an effective manner. For this reason, the use of the toolbox will be explained with three different case studies. These case studies will show the tips and tricks in using the DEDIPAC-toolbox.

A9.3 Case studies in 5 European countries investigating conditions for successful implementation and transferability

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The transfer of effective interventions promoting physical activity (PA) and a healthy diet and the implementation of policies targeting these behaviours are processes not well understood. The aim of the study was to gain a better understanding of what health promotion professionals and policy makers think are important factors facilitating implementation and transfer of both multi-component/multi-level interventions and policies targeting diet and PA in Belgium, Germany, Ireland, Norway, and Poland. To examine this question, six intervention and six policy cases were identified.
based on predefined criteria. Subsequently, forty interviews were conducted with stakeholders from various groups to elicit information on factors impacting implementation, transferability, and sustainability. The results show that an active involvement of relevant stakeholders from politics, health and education sectors, as well as of intervention/policy implementers and good communication between coordinating organizations and the government, private organizations, and settings are important factors contributing to a successful implementation of both interventions and policies. Additional facilitating factors included sufficient training of staff to ensure implementation, according to existing intervention/policy protocols, and tailoring of materials to match needs and (language) skills, and socio-cultural context of various target groups. Sustainability of implemented interventions/policies depended on whether they were embedded in existing or newly created organizational structures of different settings and whether continued funding was secured (often depending on political support). To conclude, despite considerable heterogeneity in interventions and health policies between European countries, factors facilitating implementation, transferability, and sustainability appear to be similar for interventions and policies and across Europe.