I.Family: key results and suggestions for future priorities in research on childhood obesity

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- on behalf of the I.Family consortium -

European Commission – Meeting of the High Level Group on Nutrition and Physical Activity,
Brussels, November 23rd 2016

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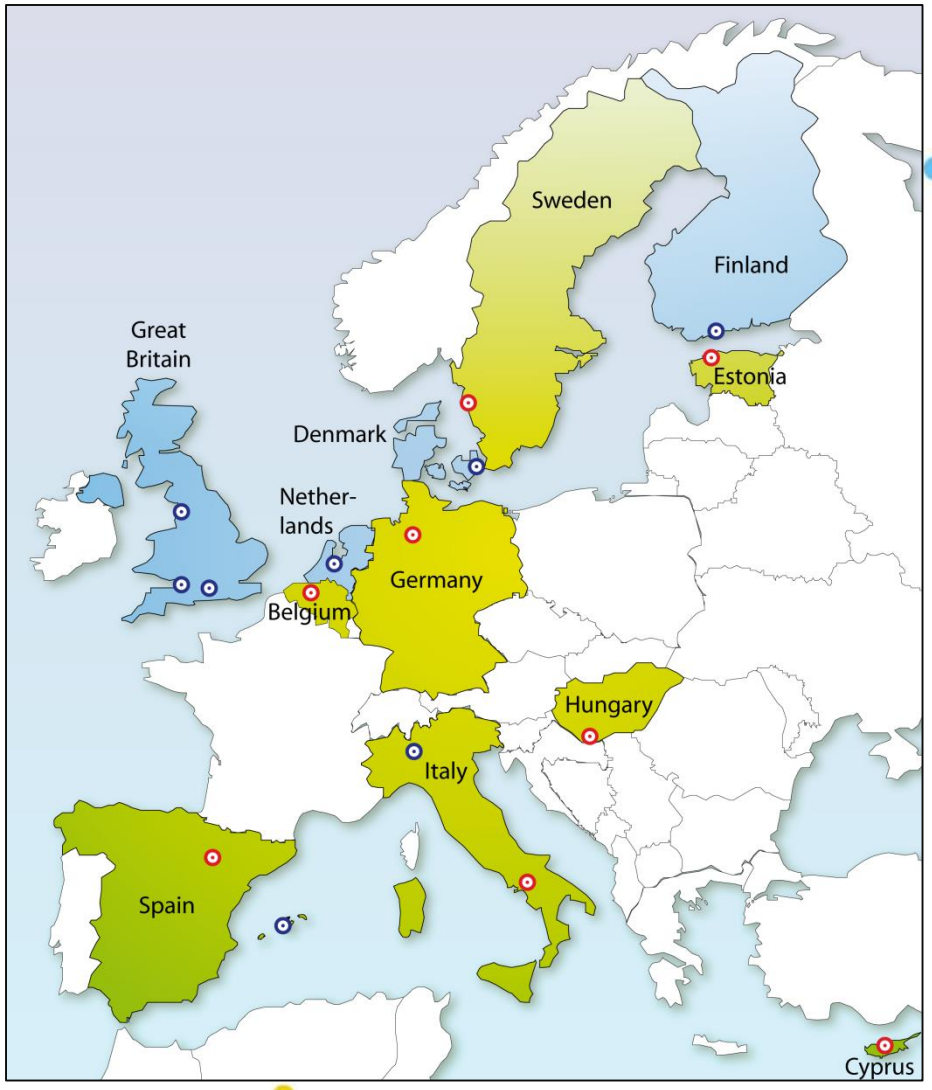

Partners

1. Strovolos, Cyprus
2. Ghent, Belgium
3. Copenhagen, Denmark
4. Tallin, Estonia
5. Helsinki, Finland
6. Bremen, Germany
7. Pécs, Hungary
8. Avellino, Italy
9. Milan, Italy
10. Utrecht, Netherlands
11. Palma de Mallorca, Spain
12. Zaragoza, Spain
13. Gothenburg, Sweden
14. Bristol, United Kingdom
15. Lancaster, United Kingdom
16. Andover, United Kingdom

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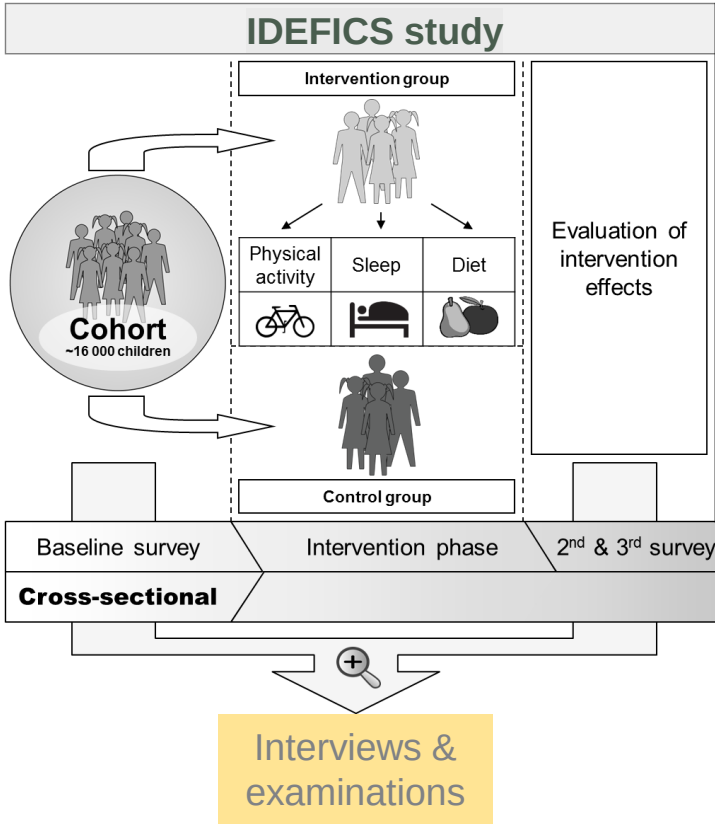
Longitudinal design of I.Family and concatenation with IDEFICS



Ahrens W et al. Cohort Profile: The transition from childhood to adolescence in European children – how I.Family extends the IDEFICS cohort. Int J Epifdemiol 2016. DOI: 10.1093/ije/dyw317

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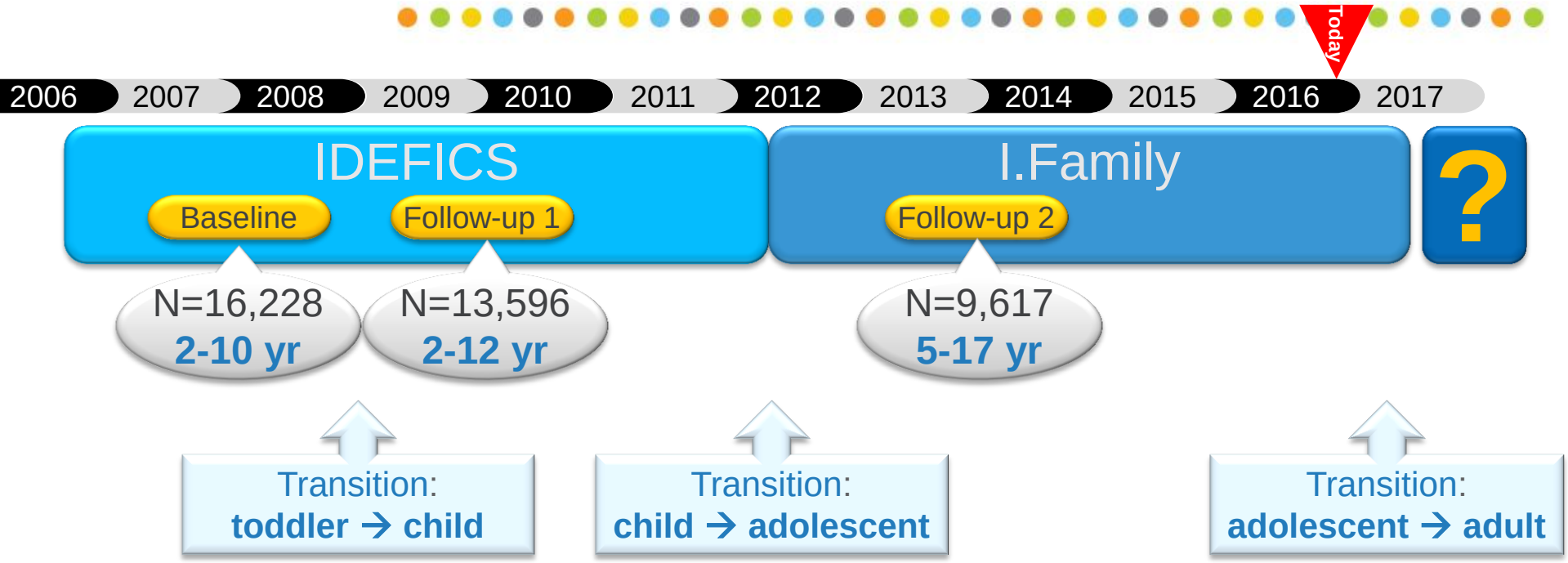
Timeline of recruitment and follow-up

IDEFICS – I.Family cohort



Endpoints: Food choice, eating behaviour, health indicators (body composition, metabolic profile, bone health)

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MAIN RESULTS

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Dietary behaviours

- Children with **low socioeconomic background**
  → persistently **unhealthier dietary profiles** over a 2-year period[29]

- Dietary patterns rich in **vegetables, wholemeal cereals and fruit** and low in animal products
  → lower risk of OW/obesity
  → **less 2-year weight gain**[27,28]

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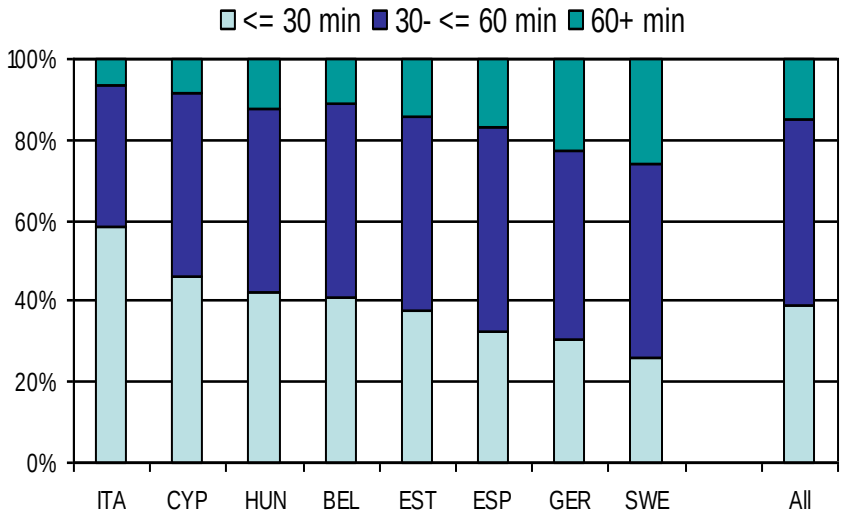
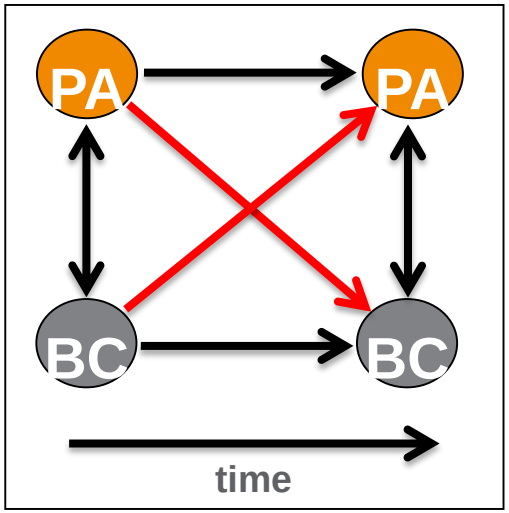
Physical activity and the built environment

- Few children meet physical activity (PA) guidelines (60min MVPA/ day)[32]



- Bidirectional longitudinal association between PA and weight status:
  - Higher fat mass/ fat mass increases → subsequent decline in MVPA
  - Just 10 minutes more MVPA per day → prevent excess weight gain in children



PA = Physical Activity; BC = Body Composition

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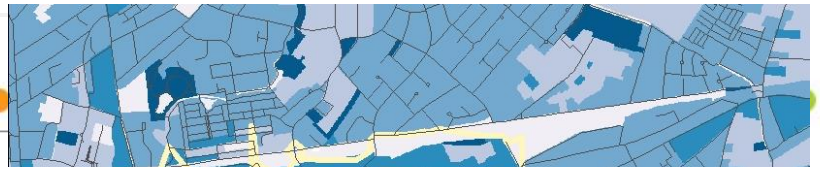
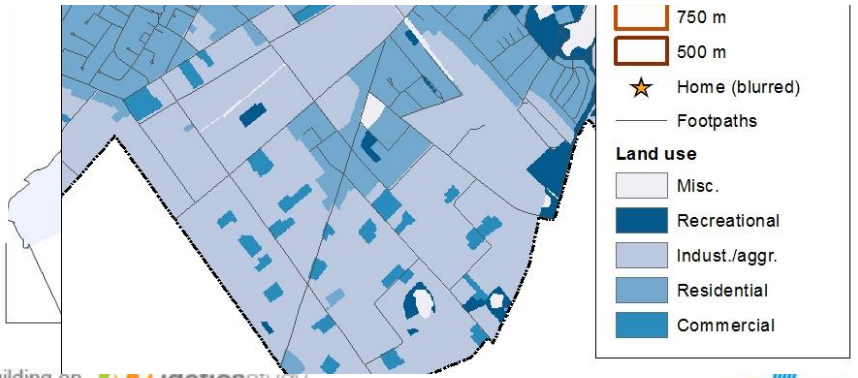
Built environment: moveability index



- Neighbourhood
  - Individual place of residence
  - Network dependent environment
- Walkability measures (Freeman et al, 2013)
  - Population density
  - Land use mix
  - Connectivity (street crossings)
  - Availability of public transport
- Extension (Buck et al., 2011)
  - Public open spaces
- Availability measure (density/ intensity)
  - Anisotrope kernel density estimate
  - Mean intensity per neighbourhood (Buck et al., 2015a)

- **PA-friendliness** of the built environment (=moveability)
  → **more MVPA** of 596 primary school children in the German study region[34]
- **Playground density** and density of playgrounds and parks combined
  → positive effects on MVPA[35]



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Sleep

- **Short sleep duration**
  → being **overweight** – particularly in primary school children[36]

- Inverse relationship between sleep duration and BMI
  → mainly explained by the inverse association between sleep duration & fat mass
  - Insulin may explain part of this association, in particular in heavier children (at the upper tail of the BMI distribution)[37]

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Media consumption

- One-third of **children exceeded screen time recommendations** (max. 2h/day).[38] Children exceeding sedentary guidelines
  → increased risk of **high blood pressure**[39]
- Watching **TV during meals**, having a **TV in the children's bedroom** and watching **TV more than 1h/day**
  → **being OW/obese**[40]
- TV exposure
  → **preference for sugary/fatty foods**
  → followed by higher consumption of **sugar-sweetened beverages**
  → increased the risk of **OW/obesity**[41]

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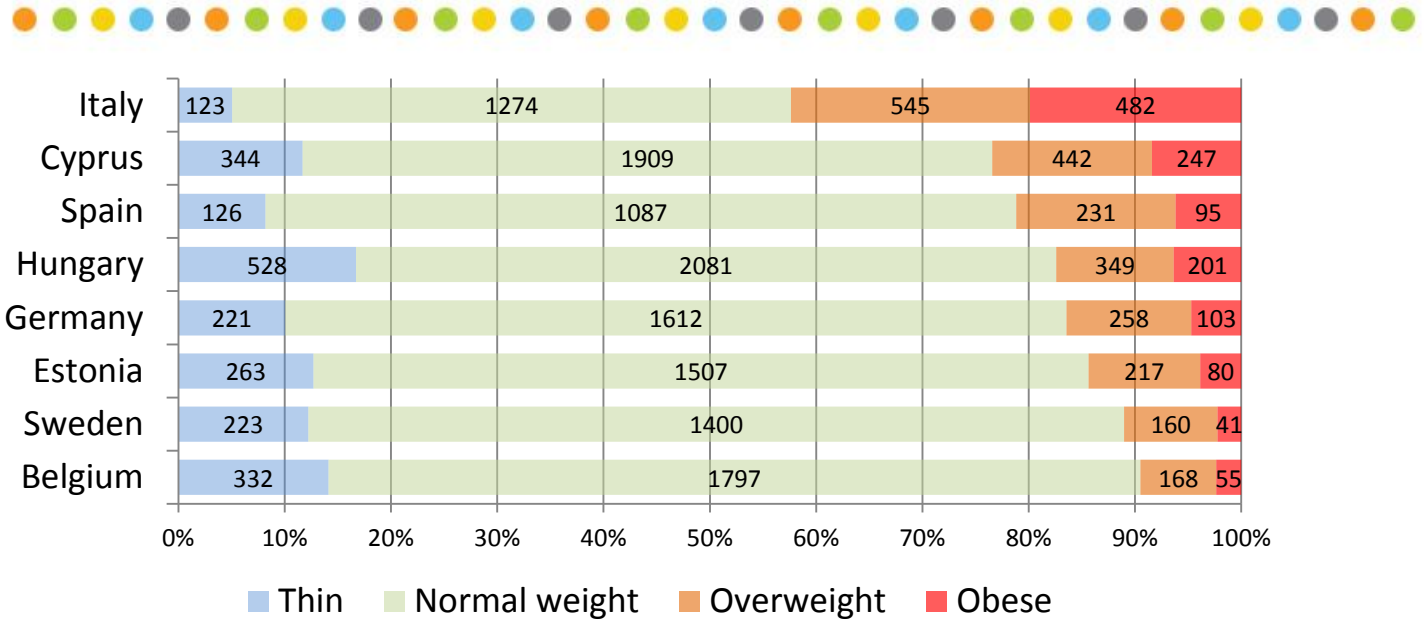
Metabolic health – risk prediction models



- To identify sensitive periods affecting health we analysed **body mass index (BMI) trajectories** during infancy/childhood and **later metabolic risk**.[48] Starting from birth, rapid BMI growth, especially between 9 months to <6 years, increased later metabolic risk in children

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SUGGESTIONS FOR FUTURE RESEARCH ON CHILDHOOD OBESITY

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1. Life-course approach: longitudinal studies

- The causes of obesity can only be understood in a **life-course perspective**
  - Identification of sensitive periods (including intrauterine life)
  - Accumulation of risks over time
  - Analysis of weight trajectories, rather than single points in time
  - Development of risk prediction models → selective early intervention
- **Birth cohort** followed from prenatal periods to adulthood
- Funding for further **follow-up of existing children cohorts**
- Use of **novel technology** to **monitor & influence** behaviour
  - mHealth (smart phones, accelerometers, …)

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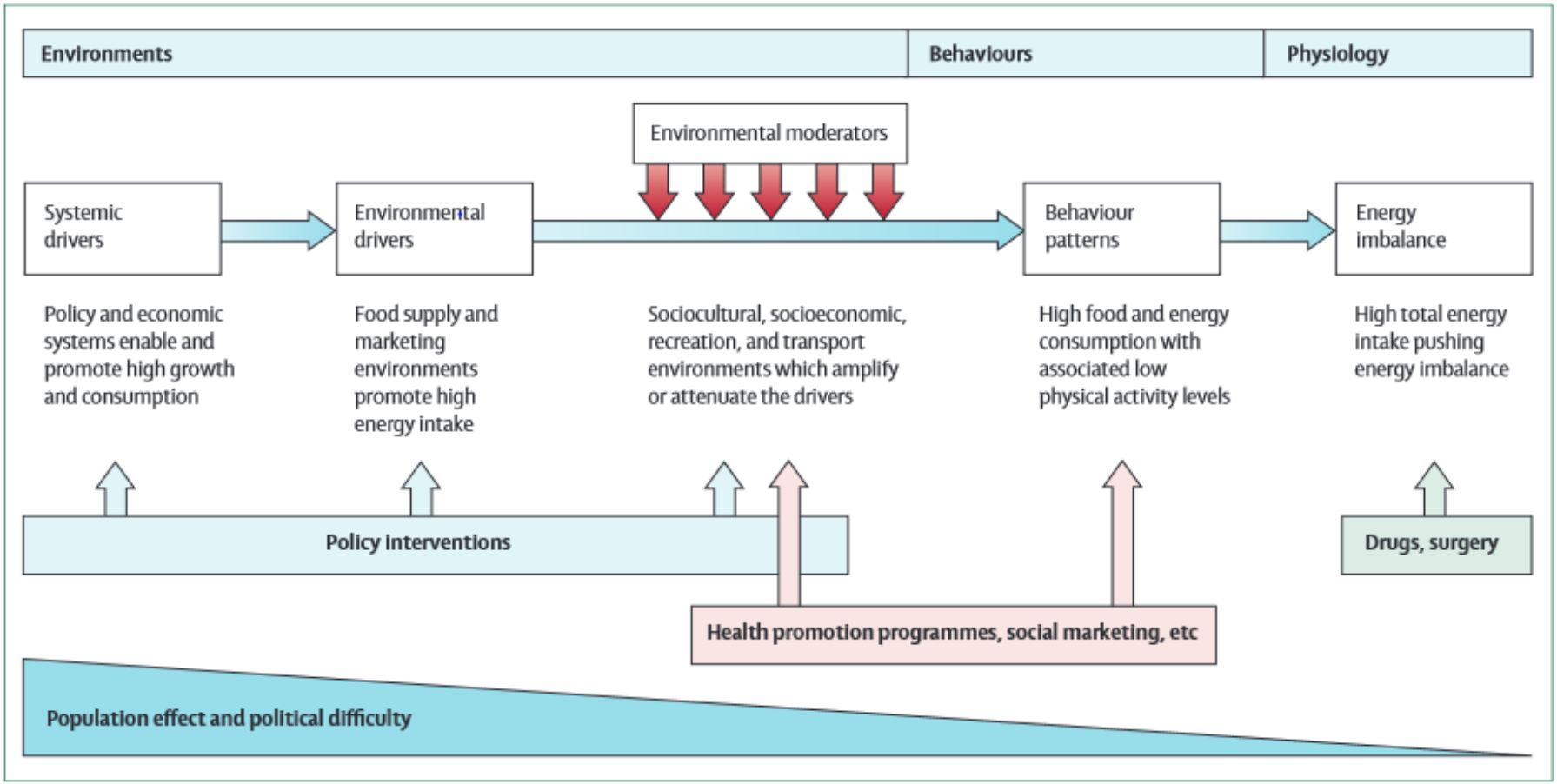
System levels of factors influencing the development of obesity



Swinburn BA, Sacks G, Hall KD, McPherson K, Finegood DT, Moodie ML, Gortmaker SL. *The global obesity pandemic: shaped by global drivers and local environments.* ***Lancet****. 2011 Aug 27;378(9793):804-14.*

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2. Environmental determinants of health behaviours

- To prevent obesity **health-related behaviours need to be changed** in a favourable direction
- Health behaviours are shaped by the **obesogenic environment**
  - Built/ physical environment
  - Social & cultural environment
  - Political & regulatory environment
- Our **understanding of determinants** of diet, physical activity and sedentary behaviours **is limited** (→ DEDIPAC)
- Future research should focus on the **forces driving our health behaviours**

ifamily

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SEVENTH FRAMEWORK PROGRAMME

3. Effectiveness of policy interventions

- Assess evidence from **existing policy interventions** (e.g. sugar tax) & **learn from other** public health **domains** (e.g. smoking ban, seat belts)
- Monitor & assess **accountability of governments & the private sector** to create healthy food environments
  - Assess implementation of good practice nutrition policies by governments to reduce child obesity
  - Assess comprehensiveness, strength & performance of commitments to reduce child obesity
- Assess **choice architecture** & behavioural public policy
  - Childhood obesity nudges
- Harmonised **monitoring system of childhood obesity** & related behaviours across Europe → Funding for **methods platform**

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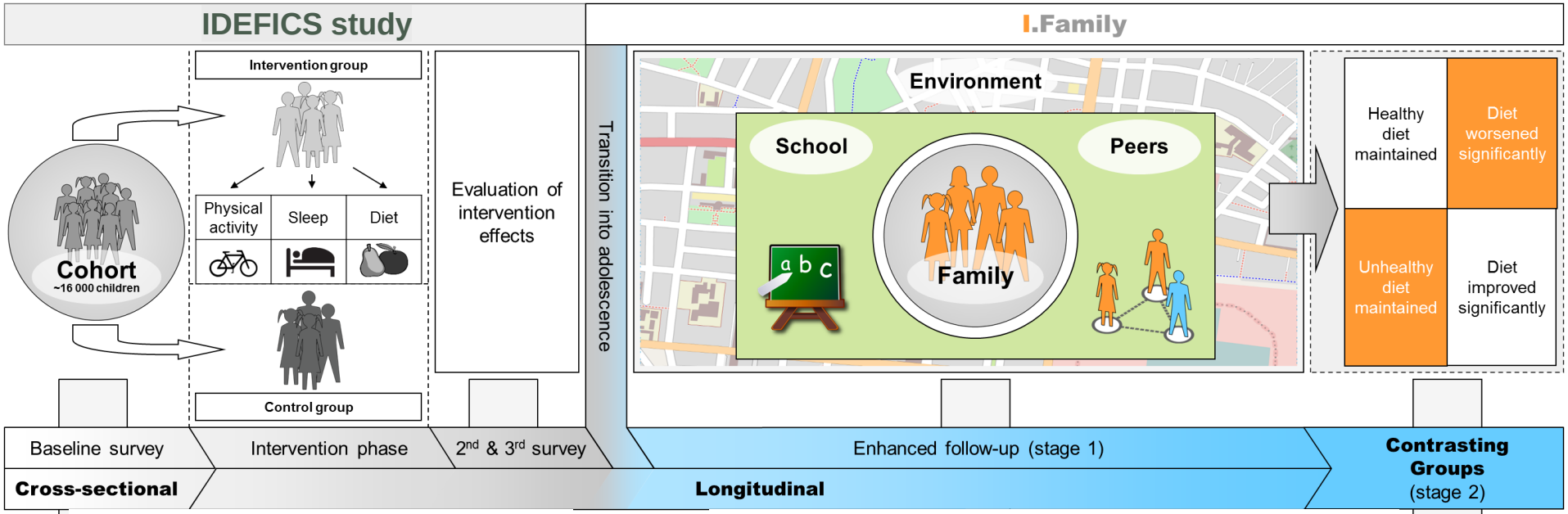
Thank you!



www.idefics.eu

Determinants	Diet	Physical activity	Sleep	SES	Genes	Biomarker	Environ. & family life
Assessment	FFQ 24h dietary recall	Quest. Accelero-meters	Quest.	Quest.	Saliva	Urine Blood	Parental quest. School quest. GIS

per child

Outcome	Lifestyle & nutrition related diseases and disorders		
	Overweight & Obesity	Musculoskeletal disorders	Insulin resistance
Assessment	Anthropometry	Ultrasonography	Biomarkers

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Determinants	Psych. profile	Physical activity	Sleep	Social facors	Body comp.	Biomarker	Family	Media	Genes	Sensory percept.	Environment	Gene expression	Social environ.	Setting factors
Assessment	Neuro-psych. tests & quest.	Quest. Accelero-meters	Quest. Activity monitor	Quest.	Anthro-pometry	Urine Blood	Quest. Pedigree analysis	CAQDA	Saliva	Taste threshold	GIS GPS	Blood microRNA profiling	Tween quest. Network analysis	Canteen exp.

per family member

Outcome	Eating behaviour, diet & food choice	
Assessment	FFQ Web-based 24h dietary recall	Gene expression microRNA profiling fMRI

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Obesity prevention study

- Although the IDEFICS intervention was developed according to state-of-the-art knowledge, only weak effects were observed after 2 years of follow-up[55]
- However, beneficial effects after 2 years in children who were already overweight at baseline[56]
- Moreover, 6 years after the intervention phase parents and children who were exposed to the IDEFICS intervention had lower propensities to consume sugar than control families[57]

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