

## Effect of a lifestyle intervention on adiposity and fitness in high-risk subgroups of preschoolers (Ballabeina): a cluster-randomized trial

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### Background/Introduction

Overweight (OW) and low fit (LF) children have a clustered risk for later cardiovascular disease. We therefore investigated, whether a preschool-based lifestyle intervention was effective in OW and LF children.

### Methods

Forty preschool classes were randomly selected and 1:1 randomized into an intervention and a control arm after stratification for language region (French vs. German part of Switzerland). The intervention included a physical activity (PA) program, lessons on eating habits, media use and sleep, and adaptation of the built environment. Primary outcomes were changes in BMI and aerobic fitness; secondary outcomes changes in percent body fat, sum of 4 skinfolds (SF), waist circumference and motor agility. Potential interactions of intervention with high baseline BMI (OW  $\geq 90$ th national percentile) and low fitness (lowest sex- and age-adjusted quartile of aerobic fitness) were tested and stratified analyses performed.

### Results

652 preschool children (mean age  $5.2 \pm 0.6$  yrs, 20% OW, 25% LF) participated. In the total population, the intervention had beneficial effects on body fat and both fitness measures. Compared to their counterparts, OW children experienced more beneficial e-fects for most and LF children for all adiposity measures (p for interactions  $<0.1$ ), while there were no interactions for fitness measures. OW children showed a significant inter-vention effect (adjusted changes (95% CI) in sum of 4 SF (-3.6 mm (-6.5 to -0.8 mm),  $p=0.011$ ), waist circumference (-2.2 cm (-3.2 to -1.2 cm),  $p<0.001$ ) and agility (-1.0 s (-1.9 to -0.1 s),  $p=0.023$ ). LF children showed a significant intervention effect in BMI (-0.3 kg/m<sup>2</sup> (-0.5 to -0.03 kg/m<sup>2</sup>),  $p=0.014$ ), percent body fat (-2.1% (-3.2 to -1.0%),  $p<0.001$ ), sum of 4 SF (-5.0 mm (-7.4 to -2.7 mm),  $p<0.001$ ) and waist circumference (-1.62 cm (-2.7 to -0.5 cm),  $p=0.004$ ) but not in fitness measures.

### Conclusion

This intervention was also effective in high risk preschoolers and represents a promising option for OW and LF children.

## Long-term follow-up of patients with Phenylketonuria – a single center experience

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### Background

Phenylketonuria (PKU) is an autosomal-recessiv metabolic disease (incidence 1:17'000 births). It is characterized by a decreased activity of the enzyme phenylalanine-hydroxylase that metabolizes the essential amino acid phenylalanine (Phe) to tyrosine (Tyr). Increased levels of Phe during childhood are associated with severe neurological impairment. Assessment of Phe-levels is part of the neonatal-screening program in Switzerland since 1960s. Data on long-term follow-up is scant. In particular, data on schooling, apprenticeship and the integration of these patients in the professional life is currently not available. We, therefore, retrospectively analyzed patients with PKU that were treated throughout childhood and adulthood at the University Hospital of Bern.

### Methods

All patients with PKU that are currently treated at the Division of Endocrinology, Diabetology and Clinical Nutrition of the Inselspital were included. Time point of diagnosis (neonatal screening vs later) and additional specialized schooling support (logopedia, ergotherapy, specific legasthenia training, special school-classes) were recorded. Accomplished apprenticeship and higher school diploma as well as inability to complete a professional formation or patients with disability annuity (IV) in adulthood were documented. All the available Phe-levels were recorded and a mean Phe-concentration/year/patient was calculated. Time period of observation was chosen according to the guidelines of the Swiss metabolic group for the follow-up of patients with PKU, i.e. 0-2 year, 2-10 years and >10 years old.

### Results

Twenty-seven patients (13 females, 14 males) were included. The mean (SD) age at the last visit was 27.4 (7.9) years. The mean (SD) follow-up period was 25.1 (7.6) years. Twenty-three patients were diagnosed by neonatal screening, the remaining 4 patients later (the latest time point was after 3.8 years). The Phe levels during follow-up of these two groups were not significantly different. 15% (4 patients) of the patients completed high school or are at the university. All were diagnosed at neonatal screening and mean (SD) Phe levels were: 0-2 years: 360 (62)  $\mu\text{mol/L}$ ; 2-10 years 320 (62)  $\mu\text{mol/L}$ ; > 10 years: 379 (78)  $\mu\text{mol/L}$ . 59% (16 patients) accomplished an apprenticeship. All were diagnosed at neonatal screening and mean (SD) Phe levels were: 0-2 years: 457 (155)  $\mu\text{mol/L}$ ; 2-10 years 450 (124)  $\mu\text{mol/L}$ ; > 10 years: 708 (286)  $\mu\text{mol/L}$ . Seven patients (26%) receive disability annuity or were not able to accomplish apprenticeship. Five of them were diagnosed after the neonatal period. Mean (SD) Phe levels were: 2-10 years: 679 (287)  $\mu\text{mol/L}$ ; > 10 years: 747 (310). Significant differences in Phe levels between the three groups (high school, apprenticeship and disability annuity) can be documented between 2-10 years of age with highest levels in the disability group followed by the apprenticeship and the high school group (ANOVA  $p<0.01$ ). Additional specialized schooling support was necessary in 52% of the patients including in 2 patients that were able to graduate at high school.

### Conclusion

- 1) Patients with PKU that are diagnosed at neonatal screening and are consequently cared for during childhood and adulthood are able to live an independent professional life.
- 2) The time of diagnosis is essential for the professional careers.
- 3) The exposition to elevated Phe levels during childhood (0-10 years) may contribute to the professional success of the patients.
- 4) Additional specialized schooling support is necessary in a substantial part of the patients.

## Role of genetic markers in Type 2 Diabetes prediction in Switzerland. The CoLaus study.

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### Background/Introduction

Some genetic markers have shown an association with Type 2 Diabetes Mellitus (T2DM). Considering the potential costs of genetic screening, the predicting value of such markers needs to be assessed. In this study, we aimed to assess the extra clinical value of several previously published genetic risk scores compared to a clinical + biological risk score.

### Methods

Prospective study conducted in 2,113 participants free from diabetes at baseline, from Lausanne, Switzerland, followed for 5 years (overall study period 2003-2011). Incident diabetes was defined as fasting plasma glucose (FPG)  $\geq 7.0$  mmol/L and/or presence of oral hypoglycemic or insulin treatment. Different genetic risk scores for T2DM were computed using published data. Their predicting effect was assessed separately after adjustment for an established risk score including clinical and biological variables.

### Results

112 participants (5.3%) developed T2DM during follow-up. On bivariate analysis, no significant differences were found between diabetic and nondiabetic participants for all the genetic scores studied. After adjusting for a clinical + biological risk score, no improvements were found regarding the area under the ROC curve (AROC), sensitivity, specificity and predictive values

### Conclusion

In this study, adding genetic information to a clinical + biological risk score does not seem to improve prediction of T2DM. Further studies or follow-up time may be needed to precisely assess the importance of genetic scores in predicting T2DM.

## Type 2 Diabetes risk scores validation in Switzerland. The CoLaus study.

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### Background/Introduction

Several risk scores for Type 2 Diabetes Mellitus (T2DM) have been developed, but few studies have compared them in the same population. The aim of this study was to assess the validity of various T2DM risk scores in predicting the incidence of T2DM in Switzerland.

### Methods

We selected seven published risk scores which included clinical and biological variables. We tested them in 3,060 non-diabetic participants from Lausanne, Switzerland, followed for 5 years (overall study period 2003-2011). Incident diabetes was defined as fasting plasma glucose (FPG)  $\geq 7.0$  mmol/L and/or presence of oral hypoglycemic or insulin treatment. The Area under the ROC curve (AROC), sensitivity, specificity, negative and positive predictive values were assessed.

### Results

After 5 years follow-up, 169 patients (5.5%) developed T2DM. The AROC of the seven tested scores ranged between 76.1 and 89.9%. They also presented a high specificity (85.2 to 99.1%) and a high negative predictive value (94.8 to 97.7%). Conversely, their sensitivity was rather low (10.1 to 65.7%), which was also the case for their positive predictive values (17.8 to 35.7%). The highest AROC was found using clinical + biological score from Kahn et al. (89.9%) followed by the clinical FINDRISC score (85.1%), and the online score from the Swiss Diabetes Association (84.7%)

### Conclusion

The clinical + biological risk score from Kahn et al. has the highest AROC, but the clinical FINDRISC score may be more practical and less expensive for screening. Further research is needed to assess the real impact of these scores in preventing T2DM.

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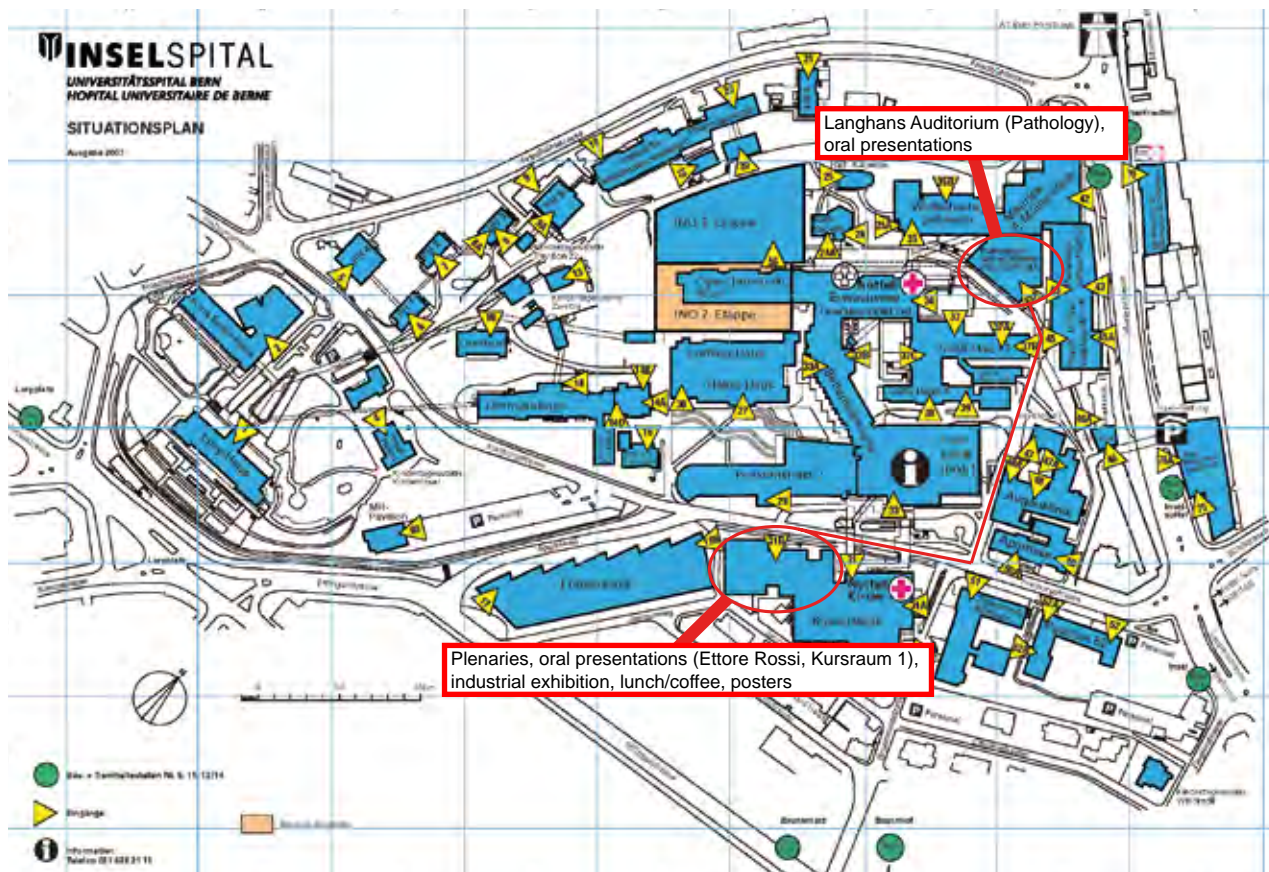
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