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BMI, waist circumference and body fat measurements as well as NCD risk factors in 6 to 12 year old children in Switzerland – 2023 study

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Abstract

Background Global childhood obesity rates are projected to increase in the near future, but several countries, including Switzerland have shown a stabilization over the past years. Whether this stabilization is sustainable and what its cause is remains to be studied. Therefore, the main aim of this study was to investigate the time trend in the prevalence of overweight and obesity in 6 to 12 year old children in Switzerland over the period from 2002 to 2023. Furthermore, a secondary objective was to assess risk factors for obesity and the later development of NCDs using a questionnaire.

Methods Using probability-proportionate to size cluster sampling we recruited a national sample of children aged 6 to 12 years in 2023 (n=1245). Height and weight were measured to calculate BMI (kg/m2). BMI cutoffs proposed by the Centers for Disease Control and Prevention (CDC), the International Obesity Task Force (IOTF) and WHO were used to determine prevalence of overweight and obesity. Waist circumference was measured, and body fat calculated based on multiple skinfold thicknesses. To evaluate the time trend, data from similar surveys conducted in 2002 (n=2493), 2007 (2218), 2012 (2963), and 2017/18 (n=2279) was included.

Results Using the CDC references, the prevalence (95% CI) of overweight and obesity was 11.4% (9.6-13.2) and 4.7% (3.6-5.9), respectively. No significant difference between sex was observed. The time trend analysis between 2002 and 2023 showed a weak but significant trend towards a reduction in childhood overweight including obesity (p=0.005, B(SE)=-0.011, OR= 0.989 (0.982-0.997). On the other hand, there was no change in the prevalence of obesity alone (p=0.099, B(SE)= -0.010 (0.006), OR= 0.990 (0.978-1.002)). Using % body fat, the prevalence of overweight was 8.6% (7.0-10.2) while 2.1% (1.3-2.9) were obese. At increased risk for metabolic disease were 8.8% (7.2-10.3) based on waist circumference measurements. The most important risk factors for the development of overweight and obesity as defined by BMI were found to be parental origin, parental education, media consumption as well as several dietary factors. The median life satisfaction out of 10 was 9, 9, and 8.5 in the normal weight, overweight, and obese children, respectively. The majority of the children rated their health status as either good or very good, namely 98.3%, 95.8%, and 91.2% in the normal weight, overweight, and obese group, respectively.

Conclusion We have shown a weak but significant declining trend in the childhood overweight/obesity prevalence over the past 20 years in Switzerland. We have confirmed two of the most important predictors being parental origin and parental education. Thus, emphasizing again that migrant populations and people with low education seem to be the most promising target groups for prevention programs. As opposed to the last survey, duration of media consumption rather than reaching the recommendation for physical activity for children (1h per day) was found to be a further predictor and several dietary factors should also be considered.

BMI-, Bauchumfang- und Körperfett-Messungen sowie NCD-Risikofaktoren bei 6-12 jährigen in der Schweiz

Zusammenfassung

Hintergrund Es wird prognostiziert, dass die Fettleibigkeitsraten bei Kindern in naher Zukunft weltweit ansteigen werden, aber mehrere Länder, darunter die Schweiz, haben in den letzten Jahren eine Stabilisierung verzeichnet. Ob diese Stabilisierung nachhaltig ist und was die Ursachen dafür sind, muss noch untersucht werden. Das Hauptziel dieser Studie war es daher, die zeitliche Entwicklung der Prävalenz von Übergewicht und Adipositas bei 6- bis 12-jährigen Kindern in der Schweiz im Zeitraum von 2002 bis 2023 zu untersuchen. Ein weiteres Ziel war es, die Risikofaktoren für Adipositas und die spätere Entwicklung von NCDs mit Hilfe eines Fragebogens zu erfassen.

Methoden Mit Hilfe einer Stichprobe, die im Verhältnis zur Einwohnerzahl ausgewählt wurde, haben wir im Jahr 2023 eine nationale Gruppe von Kindern im Alter von 6 bis 12 Jahren rekrutiert (n=1245). Größe und Gewicht wurden gemessen, um den BMI (kg/m2) zu berechnen. Zur Bestimmung der Prävalenz von Übergewicht und Adipositas wurden die von den Centers for Disease Control and Prevention (CDC), der International Obesity Task Force (IOTF) und der WHO vorgeschlagenen BMI-Grenzwerte verwendet. Der Taillenumfang wurde gemessen und das Körperfett auf der Grundlage mehrerer Hautfaltendicken berechnet. Zur Bewertung der zeitlichen Entwicklung wurden Daten aus methodisch vergleichbaren Erhebungen aus den Jahren 2002 (n=2493), 2007 (2218), 2012 (2963) und 2017/18 (n=2279) miteinbezogen

Resultate Unter Verwendung der CDC-Referenzwerte lag die Prävalenz (95% CI) von Übergewicht und Adipositas bei 11,4% (9,6-13,2) bzw. 4,7% (3,6-5,9). Es wurde kein signifikanter Unterschied zwischen den Geschlechtern festgestellt. Die Zeittrendanalyse zwischen 2002 und 2023 zeigte einen schwachen, aber signifikanten Trend zu einer Verringerung von Übergewicht und Adipositas bei Kindern (p=0,0085, mit einer geschätzten Veränderung der log-odds pro Jahr von -0,0098). Andererseits gab es keine Veränderung bei der Prävalenz von Adipositas allein (p=0,08). Gemessen anhand des Körperfettanteils lag die Prävalenz von Übergewicht bei 8,6 % (7,0-10,2), während 2,1 % (1,3-2,9) fettleibig waren. Ein erhöhtes Risiko für eine metabolische Erkrankung hatten 8,8 % (7,2-10,3) auf der Grundlage der Messung des Taillenumfangs. Als wichtigste Risikofaktoren für die Entwicklung von Übergewicht und Adipositas, definiert durch den BMI, erwiesen sich die elterliche Herkunft, die elterliche Ausbildung, der Medienkonsum sowie verschiedene Ernährungsfaktoren. Der Median der Lebenszufriedenheit auf einer Skala von 10 lag bei den normalgewichtigen, übergewichtigen und adipösen Kindern bei 9, 9 bzw. 8,5. Die Mehrheit der Kinder bewertete ihren Gesundheitszustand als gut oder sehr gut, nämlich 98,3 %, 95,8 % bzw. 91,2 % in der normalgewichtigen, übergewichtigen und fettleibigen Gruppe.

Schlussfolgerung Wir konnten einen schwachen, aber signifikanten Rückgang der Prävalenz von Übergewicht und Adipositas bei Kindern in den letzten 20 Jahren in der Schweiz nachweisen. Wir haben bestätigt, dass zwei der wichtigsten Prädiktoren die elterliche Herkunft und die elterliche Bildung sind. Dies unterstreicht erneut, dass Migranten und Menschen mit niedrigem Bildungsniveau die vielversprechendsten Zielgruppen für Präventionsprogramme zu sein scheinen. Im Gegensatz zur

letzten Erhebung wurde festgestellt, dass nicht das Einhalten der Bewegungsempfehlung für Kinder (1 Stunde täglich), sondern die Medienkonsumdauer ein weiterer Prädiktor ist und dass verschiedene Ernährungsfaktoren ebenfalls berücksichtigt werden sollten.

IMC, tour de taille et mesure de la graisse corporelle ainsi que facteurs de risque de MNT chez les enfants âgés de 6 à 12 ans en Suisse

Résumé

Contexte Les taux d'obésité infantile dans le monde devraient augmenter dans un avenir proche, mais plusieurs pays, dont la Suisse, ont enregistré une stabilisation au cours des dernières années. La question de savoir si cette stabilisation est durable et quelle en est la cause reste à étudier. L'objectif principal de cette étude était donc d'étudier l'évolution de la prévalence du surpoids et de l'obésité chez les enfants de 6 à 12 ans en Suisse sur la période allant de 2002 à 2023. En outre, un objectif secondaire était d'évaluer les facteurs de risque de l'obésité et du développement ultérieur de maladies non transmissibles à l'aide d'un questionnaire.

Méthodes En utilisant un échantillonnage en grappe proportionnel à la taille, nous avons recruté un échantillon national d'enfants âgés de 6 à 12 ans en 2023 (n=1245). La taille et le poids ont été mesurés pour calculer l'IMC (kg/m2). Les seuils d'IMC proposés par les Centers for Disease Control and Prevention (CDC), l'International Obesity Task Force (IOTF) et l'OMS ont été utilisés pour déterminer la prévalence du surpoids et de l'obésité. Le tour de taille a été mesuré et la graisse corporelle calculée sur la base de plusieurs épaisseurs de plis cutanés. Pour évaluer la tendance temporelle, les données d'enquêtes similaires menées en 2002 (n=2493), 2007 (2218), 2012 (2963) et 2017/18 (n=2279) ont été incluses.

Résultats En utilisant les références du CDC, la prévalence (IC 95 %) du surpoids et de l'obésité était respectivement de 11,4 % (9,6-13,2) et de 4,7 % (3,6-5,9). Aucune différence significative n'a été observée entre les sexes. L'analyse des tendances temporelles entre 2002 et 2023 a montré une tendance faible mais significative à la réduction du surpoids et de l'obésité chez l'enfant (p=0,0085, avec une variation du logarithme des probabilités par an estimée à -0,0098). En revanche, la prévalence de l'obésité seule n'a pas changé (p=0,08). En utilisant le pourcentage de graisse corporelle, la prévalence de la surcharge pondérale était de 8,6 % (7,0-10,2), tandis que 2,1 % (1,3-2,9) étaient obèses. Les enfants présentant un risque accru de maladie métabolique étaient au nombre de 8,8 % (7,2-10,3) sur la base des mesures du tour de taille. Les facteurs de risque les plus importants pour le développement du surpoids et de l'obésité, tels que définis par l'IMC, sont l'origine parentale, l'éducation parentale, la consommation de médias ainsi que plusieurs facteurs alimentaires. La médiane de la satisfaction de la vie sur 10 était de 9, 9 et 8,5 chez les enfants de poids normal, en surpoids et obèses, respectivement. La majorité des enfants ont jugé leur état de santé bon ou très bon, à savoir 98,3 %, 95,8 % et 91,2 % dans les groupes de poids normal, de surpoids et d'obésité, respectivement.

Conclusion Nous avons mis en évidence une tendance à la baisse, faible mais significative, de la prévalence du surpoids et de l'obésité chez l'enfant au cours des 20 dernières années en Suisse. Nous avons confirmé que deux des prédicteurs les plus importants sont l'origine et l'éducation des parents. Ainsi, nous soulignons à nouveau que les populations migrantes et les personnes à faible niveau d'éducation semblent être les groupes cibles les plus prometteurs pour les programmes de prévention.

Contrairement à la dernière enquête, ce n'est pas le respect des recommandations en matière d'activité physique pour les enfants (1 heure par jour) qui constitue un autre facteur prédictif, mais la durée de consommation des médias, et que différents facteurs nutritionnels devraient également être pris en compte.

IMC, girovita e misurazioni del grasso corporeo nonché fattori di rischio di malattie non trasmissibili nei bambini di età compresa tra i 6 e i 12 anni in Svizzera

Bozza

Retroscena I tassi di obesità infantile a livello mondiale sono destinati ad aumentare nel prossimo futuro, ma diversi Paesi, tra cui la Svizzera, hanno mostrato una stabilizzazione negli ultimi anni. Se questa stabilizzazione sia sostenibile e quale sia la sua causa è ancora da studiare. Pertanto, l'obiettivo principale di questo studio è stato quello di analizzare l'andamento temporale della prevalenza di sovrappeso e obesità nei bambini di età compresa tra i 6 e i 12 anni in Svizzera nel periodo compreso tra il 2002 e il 2023. Inoltre, un obiettivo secondario era quello di valutare i fattori di rischio per l'obesità e il successivo sviluppo di NCD utilizzando un questionario.

Metodi Utilizzando un campionamento a grappolo proporzionato alle dimensioni abbiamo reclutato un campione nazionale di bambini di età compresa tra 6 e 12 anni nel 2023 (n=1245). Sono stati misurati altezza e peso per calcolare l'IMC (kg/m2). Per determinare la prevalenza del sovrappeso e dell'obesità sono stati utilizzati i valori limite dell'IMC proposti dai Centri per il controllo e la prevenzione delle malattie (CDC), dalla Task Force internazionale sull'obesità (IOTF) e dall'OMS. È stata misurata la circonferenza della vita e il grasso corporeo è stato calcolato in base a diversi spessori della pelle. Per valutare il trend temporale, sono stati inclusi i dati di studi simili condotti nel 2002 (n=2493), 2007 (2218), 2012 (2963) e 2017/18 (n=2279).

Risultati Utilizzando i riferimenti CDC, la prevalenza (95% CI) di sovrappeso e obesità è stata rispettivamente dell'11,4% (9,6-13,2) e del 4,7% (3,6-5,9). Non è stata osservata alcuna differenza significativa tra i due sessi. L'analisi del trend temporale tra il 2002 e il 2023 ha mostrato una tendenza debole ma significativa alla riduzione del sovrappeso infantile e dell'obesità (p=0,0085, con una variazione dei log-odds per anno stimata a -0,0098). D'altra parte, non vi è stata alcuna variazione nella prevalenza della sola obesità (p=0,08). Utilizzando la % di grasso corporeo, la prevalenza del sovrappeso era dell'8,6% (7,0-10,2), mentre il 2,1% (1,3-2,9) era obeso. I soggetti a maggior rischio di malattie metaboliche erano l'8,8% (7,2-10,3) in base alla misurazione della circonferenza vita. I fattori di rischio più importanti per lo sviluppo del sovrappeso e dell'obesità, definiti dall'IMC, sono risultati essere l'origine parentale, l'educazione dei genitori, il consumo di media e diversi fattori dietetici. La media di soddisfazione della vita su 10 era di 9, 9 e 8,5 nei bambini normopeso, sovrappeso e obesi, rispettivamente. La maggior parte dei bambini ha valutato il proprio stato di salute come buono o molto buono, ovvero il 98,3%, il 95,8% e il 91,2% rispettivamente nel gruppo dei normopeso, dei sovrappeso e degli obesi.

Conclusioni Abbiamo dimostrato una debole ma significativa tendenza alla diminuzione della prevalenza di sovrappeso/obesità infantile negli ultimi 20 anni in Svizzera. Abbiamo confermato che due dei predittori più importanti sono l'origine dei genitori e l'educazione dei genitori. Pertanto, sottolineiamo ancora una volta che le popolazioni migranti e le persone con un basso livello di educazione sembrano essere i gruppi target più promettenti per i programmi di prevenzione. A differenza dell'ultima indagine, è emerso che non è il rispetto della quantità di attività fisica

raccomandata per i bambini (1 ora al giorno), ma la durata del consumo di media a costituire un ulteriore fattore predittivo e che occorre tenere conto anche di vari fattori nutrizionali.

Introduction

Non-communicable diseases (NCDs) are an important global public health threat responsible for a substantial rate of mortality and morbidity and therefore causing high socio-economic costs for each affected country [1]. There is evidence that the major risk factors for NCDs can be associated with behavioral patterns mainly established during childhood and adolescence, which then continue into adulthood [2; 3; 4]. Moreover, the onset of many NCDs, such as obesity, diabetes, and cardiovascular diseases (CVD), can be prevented when risk factors earlier in life are addressed [5]. One important risk factor is childhood obesity, which is associated with strong evidence to NCDs in adulthood [2; 4].

Worldwide the prevalence of overweight and obesity in children increased dramatically during the last decades [6; 7]. In the US, the prevalence of overweight including obesity (based on CDC references) in children and adolescents increased from 16.4% in 1971-1974 to 41.5% in 2017-2018 [8].Furthermore, predictions about rapidly increasing rates in future decades were made, claiming that a majority of the children will be either overweight or obese by 2050 [10]. Nevertheless, since 2007, evidence has emerged from several countries suggesting that the increase in the obesity prevalence has slowed substantially, or even leveled off. In Switzerland, we have seen a stabilizing trend of the obesity prevalence between up to the year 2012 [11] and the last survey conducted in 2017/18 even showed a small but significant decrease in the overweight and obesity prevalence compared to the previous studies [12]. The HBSC survey 2022 in Switzerland reported a prevalence of overweight including obesity comparable to that of 2018, except for 15 year old girls, where an increase from 10.3%. to 12.2% was shown [13]. Furthermore, also the WHO European Childhood Obesity Surveillance Initiative (COSI) has reported a decrease or leveling off in the prevalence of overweight and obesity in several participating countries between round 4 (2015-2017) and round 5 (2018-2020) [14].

In Switzerland, the first national study designed to determine the prevalence of overweight and obesity among 6-12 year old Swiss children was conducted in 2002. The study revealed that the prevalence of overweight (including obesity) was 20.3% and 19.1% in boys and girls, respectively, and the prevalence of obesity 7.6% and 5.9% in boys and girls, respectively [15; 16]. Compared with regional data from the 1960's (1st Zurich Longitudinal Study) and the 1980's (2nd Zurich Longitudinal Study) this represented a 5-fold increase in overweight in boys and a 6-fold increase in girls [17; 18]. In 2007, the national study was repeated, using the same sampling design, reporting a slight decrease in the prevalence of overweight and obesity in both girls and boys. The prevalence of overweight (including obesity) was 16.7% and 13.1% in boys and girls, respectively, and the prevalence of obesity 5.4% and 3.2% in boys and girls, respectively. Data from 2012 were then rather pointing towards a stabilization over the entire period between 1999 and 2012 than towards a decrease with a prevalence of overweight (including obesity) of 20% in boys and 17.8% in girls[11]. The latest available data from the year 2017/18 showed an overweight prevalence of 12.2% in boys and 9.5% in girls, while the prevalence for obesity was estimated at 5.8% for boys at 4.5% for girls, respectively [12], which, as reported above, represented a small but significant decrease compared to earlier years. Switzerland is not the only country reporting

stabilizing trends but similar data was reported e.g. from Australia, China, France and the USA [19]. This stabilizing trend was explained using three different hypotheses [19]:

- The Intervention Hypothesis states that childhood obesity has been recognized as a major public health concern in many different countries for several years. Thus, healthy eating habits and physical activity have been successfully promoted by public health campaigns and interventions. Interventions are therefore contributing to the current trend towards the stabilization of overweight prevalence.
- The Saturation Equilibrium Hypothesis explains the stabilization of obesity rates with the reach of a point of saturation equilibrium in many countries. This equilibrium is reached, when any child with predisposition to overweight has become overweight, and the remaining children are resistant to the given environments, which offer opportunities to overeat and be inactive.
- The Self-selection Hypothesis argues that the stabilization of obesity trends might be caused by sampling bias. It is possible that with increased public awareness on childhood obesity, parents of overweight and obese children are less likely to enroll their children for studies assessing overweight and obesity in the later measurement years compared to baseline measurements.

Despite this first evidence of childhood overweight and obesity prevalence stabilizing or even decreasing in some countries, recent OECD projections show an overall steady increase of global obesity rates until at least the year 2030 [20].

Even though the direct reason for weight gain is generally a positive energy balance, the reasons for the development of obesity are multifactorial. Changes in food habits, an increasingly sedentary lifestyle as well as genetic, social and cultural factors have been described as important factors influencing obesity prevalences. Lifestyle interventions addressing different treatment aspects are generally recommended for the treatment of childhood obesity [21; 22; 23]. Even though a certain positive effect can be shown applying such programs in randomized controlled trials, weight loss is often limited over the long term and relapses are common [21]. Thus prevention programs to counteract the development of obesity should generally be emphasized. In order to develop more targeted and more successful strategies a better understanding of the importance of different factors in the development of childhood obesity within a specific society is required.

Study objectives

The principle aim of this project was to investigate the time trend in the prevalence of overweight and obesity in 6 to 12 year old children in Switzerland over the period from 2002 to 2023, by repeating the studies conducted in 2002, 2007, 2012, and 2017/18. Furthermore, a secondary objective was to assess risk factors for the later development of NCDs using a questionnaire.

Outcome parameters

1) The primary outcome parameters were weight and height to calculate body mass index. This was used to classify children in weight categories.

2) Secondary outcome parameters were waist circumference and percent body fat as assessed by skinfold thickness measurements.

3) Further secondary outcome parameters were related to lifestyle like physical activity, media consumption, sleep, dietary intake, general health and life satisfaction, as well as socioeconomic background and were assessed using a self-administered questionnaire.

Methods

Study design

In order to be comparable the current study was designed the same as the four previous ones. A probability-proportionate-to-size (PPS) cluster sampling was used to obtain a representative national sample of approximately 2500 children aged 6-12 years. PPS cluster sampling is a widely used and recommended method for anthropometric school based surveys. Current census data were used to provide a systematic sampling of urban and rural communities based on the cumulative population. The aim was to identify sixty communities, and in each of those one school, across Switzerland by stratified random selection. Schools that declined participation were systematically replaced by other randomly selected schools from the same strata. The location of the clusters is shown in Figure 1 and includes: green: Western region, blue: Central and eastern region, yellow: Northcentral region, grey: Northeastern region, and red: Southern region.
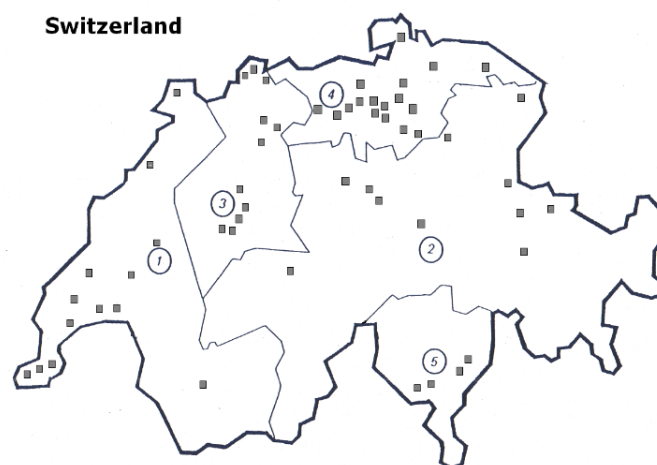
Figure 1: Map of Switzerland showing geographic regions and the location of the clusters using an exemplary probability-proportionate-to-size sampling (n=60). 1: Western region; 2: Central and eastern region; 3: Northcentral region; 4: Northeastern region; 5: Southern region

In each school willing to participate in the study, school principals were asked to select three to four classes to take part in the survey. We aimed at sampling an average of 40-45 students at each school, depending on the size of the classrooms.

An information letter describing the study and the examination process was sent to the school principal, teachers, parents and children at least 2 weeks prior to the measurement day in order to give parents/children sufficient time to consider participation. Consenting parents had to complete the consent form which the children returned to the teacher. Data was collected from March to December 2023. We obtained ethical approval from the Cantonal Ethical Committee of Zurich (Zurich, Switzerland) as a representative of all other Cantonal Ethical Committees (BASEC-Nr. 2022-01713). Where needed we obtained local authorization from cantonal or communal school or health departments. The cantons of Basel City, Schaffhausen and Thurgau decided not to participate in the survey. The study was registered in clinicaltrials.gov (NCT05697367).

For all subjects, body weight was measured to the nearest 0.1 kg using a digital balance (Soehnle, Style Sense Safe 100) and height was measured to the nearest 0.1 cm using a transportable stadiometer (SECA, 213). Body Mass Index (BMI) was calculated as weight divided by height^2. Using the BMI data, the prevalence of overweight and obesity in $6 - 12$ year old children in Switzerland was calculated based on the CDC reference values using the cut offs of the 85th and the 95th percentiles [24], the IOTF reference values for overweight and obesity extrapolated from adult cut-off points [25] as well as the 85th and the 95th percentiles of the WHO BMI for age curves [26]. Waist circumference was further measured in all children midway between the lowest rib and the iliac crest using a non-stretchable measuring tape. Using Swiss reference values for WC the 90th percentile was defined as a cut-off for increased risk for the development of the metabolic syndrome [27]. The time trend analysis as well risk factor analysis was done based on the CDC references as we have previously shown them to be more suitable for Swiss children compared to the IOTF references [16].

Body fat percentage (BF%) of each child was determined by measuring skinfold thicknesses (SFT) at four sites using a Harpender Skinfold Caliper with a resolution of 0.2 mm. The four sites were triceps, biceps, subscapular and suprailiacal [28]. For the triceps, the mid-point of the back of the upper arm between the tip of the olecranon and acromial process was determined by measuring with the arm flexed at 90 degrees. With the arm hanging freely at the side, the caliper was applied vertically above the olecranon at the marked level. Over the biceps, the SFT was measured at the same level as the triceps, with the arm hanging freely and the palm facing outwards. At the subscapular site, the was picked up just below the inferior angle of the scapula at 45° to the vertical along the natural cleavage lines of the skin. The suprailiac SFT was measured above the iliac crest, just posterior to the midaxillary line and parallel to the cleavage lines of the skin, the arm lightly held forward. All sites were measured on the right site of the body in duplicate. In every tenth participants measurements were conducted by two different investigators to determine inter-observer variability while in all other participants the duplicate measurements were performed by the same investigator to determine intra-observer variability.

Using the mean value of the repeated SFT measurements, the body density and BF% was calculated using the following equations [29]:

BF% = (562 – 4.2 * [Age (y) – 2]) / D – (525 – 4.7 *[age(y) – 2])

where D = body density

For boys: D (g/ml) = 1.169 – 0.0788 * log10 (sum of 4 SFT [mm])

For girls: D (g/ml) = 1.2063 – 0.0999 * log10 (sum of 4 SFT [mm])

Swiss reference values for BF% were used to determine overweight and obesity based on this measurement. The 85th percentile was used for overweight and the 95th for obesity [16].

In order to determine time trends in the prevalence of overweight and obesity in schoolchildren in Switzerland, we have compared the newly assessed data to data from our previous studies conducted in 2002, 2007, 2012 and 2017/18 [11; 15; 16; 30].

To better understand the reasons for obesity in children and their risk for later development of NCD, a questionnaire was distributed to each participating child enquiring about socioeconomic background, general health, physical activity, and nutritional habits. The questionnaire (in German) is attached as **Appendix.** Data entry into the RedCap database was done using a standardized procedure by 5 trained persons (CS, JS, RB, LS and GM).

The questionnaire contained a question on the place of birth of the child and both parents. For the analysis, the place of birth of the parents was categorized as follows: 'Both Swiss', Swiss and non-Swiss', and 'Both non-Swiss'. The education level of both parents was further assessed using the following categories: 'obligatory school time', 'apprenticeship without professional maturity', apprenticeship with professional maturity', 'university of applied sciences or technical university', 'university' and 'other'. Most of the responses of the category 'other' were manually assigned to one of the mentioned categories. The educational levels of both parents were combined and categorized into the following three groups: 'low' (obligatory school time), 'moderate (apprenticeship with or without professional maturity), and 'high' (university of applied sciences, technical university or university). One must mention that the 'college of higher education' was categorized as apprenticeship with professional maturity, therefore being counted as a moderate level of education.

Regarding physical activity, the children were asked for how many days in a typical week they are physically active for at least 60 minutes. Answers were categorized as follows: '≤1 day/week', '2-3 days/week' '4-5 days/week,' and '≥6 days/week'. Additionally they were asked how many days per week they played outdoors and whether they performed a specific sport on a regular basis.

The children were asked how much time they spend in front of a screen in their free time, which was used to define the overall media consumption. Media consumption was then categorized into '≤1 h/day', '>1h and ≤2 h/day', '>2h and ≤3 h/day', and '>3 h/day'.

Several dietary factors were assess using the questionnaire. The children were asked how many times in the last 4 weeks they consumed the following items: sugar-sweetened beverages (SSB), artificially sweetened beverages fruit and vegetable juices, fruits, vegetables (including salad), milk and dairy products and meat. The answers given were categorized as follows. For soft drinks (with sugar or artificially sweetened), milk and dairy products, as well as meat and fish: '≤1 day/week', '2-6 days/week', and daily. For fruits and vegetables: '<1 time/day', '2-4 times/day', and '≥5 times/day'. Children were further asked whether they normally eat breakfast habits on weekdays and weekends.

To assess the general health status of the children a few further questions were asked. Based on the time they usually go to sleep and get up the mean sleep duration was calculated during the week and on weekends. Sleep duration was categorized as follows for analysis: ≤9 h, >9-10 h, >10-11 h, and >11 h. Furthermore, the children were asked whether they suffered from any disease (diabetes, asthma, other chronic disease, hay fever, ADHS, shortsightedness, celiac disease, eating disorders) and how they felt about their health in general (feeling very well, well, rather well or not well). Further two questions asked them to judge their weight status (weight perception: much too thin, a bit too thin, about right, a bit too heavy, much too heavy) and their life in general on a scale from 1 to 10 (life satisfaction). An additional question asked about wellbeing using the WHO 5 questionnaire. Finally, the children were asked whether they had ever been tested positive for COVID-19, whether they were vaccinated against COVID-19 and whether the pandemic has had any effects on their health.

Statistical analysis

Statistical analysis was conducted using RStudio (Posit Software, Boston, MA, USA) and Excel (Microsoft Office, Microsoft Corporation, Redmond, WA, USA). Prevalence of overweight and obesity between gender was compared using the chi-square test followed by a z-test to check for significant differences between individual values. Similarly, prevalence of overweight and obesity between regions and communities of different sizes was done using the chi-square test followed by a z-test (including Bonferroni correction for multiple comparisons). The 95% confidence intervals for all prevalences were calculated using the Wilson procedure [31] as described by Robert Newcombe [32]. A binary logistic regression was used on the trends in overweight and obesity prevalence between 2002 and 2023 with survey year as a continuous variable.

Further multinomial logistic regressions were used to examine the associations between BMI category (by using the CDC references) and risk factors. Each individual risk factor was tested with the dependent variable being the BMI category and the factor each of the risk factors individually as the independent variable. The following 11 risk factors were tested: parental origin, parental education, media consumption, days physically active, sleep duration, breakfast consumption, as well as the frequency of consumption of sugar sweetened beverages, artificially sweetened beverages, dairy products, fruits and vegetables, and meat. The models were corrected for multiple testing of 11 factors using the Bonferroni–Holm correction.

Since the study design of all surveys used a probability proportionate to size cluster sampling, all data analysis was conducted with unweighted data. However, as recruitment based on the pre-defined numbers of schools per cluster was not successful in 2023, an additional analysis weighted by region was carried out for this survey for comparison.

Results

Study population

We were unable to recruit the expected number of schools. We contacted a total of 690 schools and of those 33 consented to participate, which resulted in a response rate of 4.8%. In the previous survey in 2017/18 we had contacted 491 schools in order to recruit 60, which was a response rate of 12.2%. **Table 1** shows the number of schools expected and recruited for the different clusters. In the consenting schools, we invited 2707 children to participate in the study of which 1289 consented. On the day of measurement, 36 children were absent, resulting in a sample size of 1253 and a response rate within participating schools of 47.6%. Out of this number, we had to exclude data of another 8 children because their age was 13 years and above. Thus, the number of participants included for data analysis was 1245. This corresponds 0.23% children in this age group in Switzerland. A detailed overview of the number of participants by sex, age and cluster is given in **Table 2**.

Table 1 Overview of the expected and recruited number of children in the different clusters.

Cluster	Geographic region	Population	% expected children	% recruited children	n recruited children
1			**25.0%**	**27.1%**	**338**
11	**Western region**	> 100'000	3.9%	5.2%	65
12		10'000-100'000	9.3%	0.9%	0
13		< 10'000	11.5%	21.9%	273
2			**22.0%**	**16.7%**	**208**
21	**Central and eastern region**	> 100'000	0.0%	0.0%	0
22		10'000-100'000	9.0%	2.4%	30
23		< 10'000	13.4%	14.3%	178
3			**18.0%**	**14.5%**	**180**
31	**Northcentral region**	> 100'000	3.5%	3.9%	48
32		10'000-100'000	5.5%	0.0%	0
33		< 10'000	9.5%	10.6%	33
4			**30.0%**	**33.6%**	**418**
41	**Northeastern region**	> 100'000	6.2%	10.8%	135
42		10'000-100'000	10.1%	7.1%	88
43		< 10'000	13.9%	15.7%	195
5			**4.0%**	**8.1%**	**101**
51	**Southern region**	> 100'000	0.0%	0.0%	0
52		10'000-100'000	1.6%	0.0%	0
53		< 10'000	2.6%	8.1%	101

Table 2 Number of study participants by sex, age and cluster

	N (%)
Gender	
Girls	620 (49.8%)
Boys	625 (50.2%)
Age	
6	63 (5.1%)
7	160 (12.9%)
8	223 (17.9%)
9	210 (16.9%)
10	179 (14.4%)
11	255 (20.5%)
12	155 (12.4%)
Region	
1	338 (27.1%)
2	208 (16.7%)
3	180 (14.5%)
4	418 (33.6%)
5	101 (8.1%)
Community size	
<10'000	879 (70.6%)
10'000-100'000	118 (9.5%)
> 100'000	248 (19.9%)

To evaluate the time trend in the prevalence of overweight and obesity data from four comparable previous studies was used together with the current survey [11; 12; 15; 16; 30]. Participant characteristics of all five studies are shown in Table 3.

Table 3 Characteristics of the study populations of four national surveys conducted in the years 2002, 2007, 2012, 2017/18 and 2023.

	2002	2007	2012	2017/18	2023
n	2493	2218	2963	2279	1245
Gender (% boys)	49.4	48.8	50.6	50.2	50.2
Age (y)	9.9 (6.2-13.0)[a]	10.1 (6.3-13.0)	9.9 (6.3-13.0)	9.5 (6.0-12.9)	9.8 (6.1-12.9)
Weight (kg)	32.7 (17.7-94.4)	33.2 (15.9-83.3)	32.7 (16.7-132.3)	33.1 (16.7-106.2)	32.7 (15.4-78.7)
Height (m)	1.387 ± 0.120[b]	1.400 ± 0.116	1.389 ± 0.117	1.376 ± 0.111	1.393 ± 0.092
BMI (kg/m^2)	17.1 (12.5-35.0)	16.9 (12.3-34.7)	16.9 (12.4-42.7)	17.2 (11.9-42.5)	16.8 (11.6 – 33.0)
Waist circumference (cm)	-	64.0 ± 8.0	63.2 ± 9.0	59.7 ± 7.1	61.7 ± 7.9
Body fat (%)	18.2 ± 9.0	-	19.3 ± 9.5	17.1 ± 8.0	16.5 ± 7.7
Nr. schools	57	60	58	60	38
Response rate children (%)	76.4	72.5	94.5*	55.0	47.6

[a] Median (min-max) (all such values), [b] Mean ± SD (all such values), *2012: passive consent

Overweight and obesity prevalence and time trend

The prevalence of overweight and obesity based on the different available reference values (CDC, IOTF and WHO) as well as based on body fat and waist circumference in the year 2023 is shown in Table 4. There were no significant sex differences in the overweight prevalence using any of the three BMI references. However, the overweight prevalence was significantly higher in boys compared to girls when using %BF and WC. Furthermore, the prevalence of obesity was higher in boys using the WHO BMI references as well asl %BF.

Table 4 Prevalence (% (95% CI)) of overweight and obesity or increased risk for metabolic co-morbidities based on three different BMI reference values as well as BF% (body fat percentage) and WC (waist circumference) in a national survey in Switzerland in 2023 (n=1245) (unweighted data).

	CDC	IOTF	WHO	BF%	WC*
Underweight					
Total	4.0 (3.0-5.3)	8.9 (7.3-10.5)	1.4 (0.3-2.0)		
Boys	3.5 (2.1-5.0)	8.0 (5.9-10.1)	1.1 (0.3-1.9)		
Girls	4.5 (3.1-6.3)	9.8 (7.5-12.2)	1.6 (0.8-2.7)		
Normal weight					
Total	79.8 (77.4-82.1)	76.5 (74.2-78.9)	77.4 (75.3-79.7)	89.3 (87.5-91.0)	91.2 (89.7-92.8)
Boys	77.9 (74.6-80.8)	76.3 (73.0-79.7)	77.3 (74.1-80.6)	86.3 (83.6-89.0)	89.3 (86.8-91.7)
Girls	81.8 (78.7-84.5)	76.8 (73.5-80.1)	77.6 (74.2-80.8)	92.2 (90.1-94.3)	93.2 (91.2-95.2)
Overweight/ increased risk					
Total	11.4 (9.6-13.2)	11.9 (10.1-13.7)	15.3 (13.3-17.3)	8.6 (7.0-10.2)	8.8 (7.2-10.3)
Boys	13.0[a] (10.3-15.6)	12.8[a] (10.2-15.4)	16.2[a] (13.3-19.0)	10.9[a] (8.4.-13.3)	10.7[a] (8.3-13.1)
Girls	9.8 [a] (7.5-12.2)	11.0[a] (8.5-13.4)	14.4[a] (11.6-17.1)	6.3[b] (4.4-8.2)	6.8[b] (4.8-8.8)
Obesity					
Total	4.7 (3.6-5.9)	2.7 (1.8-3.5)	5.9 (4.6-7.2)	2.1 (1.3-2.9)	
Boys	5.6[a] (3.8-7.4)	2.9[a] (1.6-4.2)	7.8[a] (5.7-9.9)	2.7[a] (1.4-4.0)	
Girls	3.9[a] (2.4-5.4)	2.4[a] (1.2-3.6)	4.0[b] (2.5-5.6)	1.5[a] (0.5-2.4)	

*Only one category of 'increased risk' was defined for WC and it was based on the 90th percentile.
Different superscript letters indicate significant differences between boy and girls for each set of references and weight category (z-test, p<0.05).

Prevalence of overweight and obesity of all five surveys is shown in Table 5 and Figure 2 based on CDC reference values. The prevalence of overweight including obesity was the following: 2002: 20.1%, 2007: 15.3%, 2012: 18.8%, 2017/18: 15.9%, 2023: 16.1%. Using a binary logistic regression, a weak but significant trend towards a reduction in childhood overweight including obesity could be identified (B(SE)= -0.011 (0.004), p= 0.005, OR= 0.989 (0.982-0.997)). On the other hand, there was no change in the prevalence of obesity alone (B(SE)= -0.010 (0.006), p=0.099, OR= 0.990 (0.978-1.002)) (compare Figure 2b).

The same trend analysis using IOTF reference values resulted in similar results. A weak but significant trend towards a reduction of overweight including obesity was identified (B(SE)= -0.009 (0.004), p= 0.014, OR= 0.991 (0.983-0.998)), but the trend was not significant for obesity alone (B(SE)= -0.011, p= 0.184, OR= 0.989 (0.974-1.005).

A similar trend analysis was conducted using waist circumference to determine between normal weight children and children with increased risk for later development of chronic disease. Similar to the BMI, this trend analysis also showed a significant reduction over time (B(SE)= -0.045, p<0.001, OR= 0.956 (0.943-0.968) (compare Figure 2c)

Table 5 Prevalence (% (95% CI)) of overweight and obesity (based on the CDC reference values) of 5 national studies in Switzerland in the 2002, 2007, 2012, 2017/18 and 2023 (unweighted data)

	2002	2007	2012	2017/18	2023
Underweight					
Total	2.7 (2.1-3.3)	3.0 (2.3-3.7)	3.4 (2.7-4.0)	4.1 (3.2-4.9)	4.0 (3.0-5.3)
Boys	2.8 (1.9-3.8)	3.4 (2.3-4.5)	3.3 (2.3-4.3)	3.8 (2.7-4.9)	3.5 (2.1-5.0)
Girls	2.5 (1.7-3.4)	2.6 (1.7-3.5)	3.5 (2.7-4.5)	4.4 (3.3-5.7)	4.5 (3.1-6.3)
Normal weight					
Total	77.0 (75.4-78.8)	81.6 (80.0-83.2)	77.4 (75.9-78.9)	79.5 (77.8-81.1)	79.8 (77.4-82.1)
Boys	76.0 (73.4-78.4)	79.2 (76.7-81.7)	76.1 (73.8-78.3)	78.6 (76.1-80.9)	77.9 (74.6-80.8)
Girls	78.1 (75.8-80.2)	83.9 (81.9-86.4)	78.8 (76.7-81.0)	80.4 (77.9-82.7)	81.8 (78.7-84.5)
Overweight including obesity					
Total	20.3 (18.6-21.7)	15.3 (13.8-16.8)	18.8 (17.4-20.3)	15.9 (14.4-17.4)	16.1 (14.1-18.2)
Boys	21.2 (18.8-23.4)	17.2 (15.1-19.6)	20.0 (18.1-22.1)	17.1 (15.1-19.4)	18.6 (15.5-21.6)
Girls	19.5 (17.2-21.5)	13.5 (11.6-15.6)	17.5 (15.6-19.5)	14.7 (12.8-16.9)	13.7 (11.0-16.4)
Overweight					
Total	13.4 (12.1-14.8)	11.0 (9.8-12.4)	11.8 (10.7-13.0)	11.1 (9.8-12.4)	11.4 (9.6-13.2)
Boys	13.4[a] (11.4-15.5)	11.8[a] (10.0-13.9)	12.1[a] (10.6-13.9)	11.4[a] (9.5-13.3)	13.0[b] (10.3-15.6)
Girls	13.4[a] (11.6-15.2)	10.2[a] (8.6-12.1)	11.5[a] (10.0-13.2)	10.8[a] (9.2-12.7)	9.8[a] (7.5-12.2)
Obesity					
Total	6.9 (6.0-8.0)	4.3 (3.5-5.2)	7.0 (6.1-8.0)	5.4 (4.4-6.3)	4.7 (3.6-5.9)
Boys	7.8[a] (6.3-9.3)	5.4[a] (4.2-6.9)	7.9[a] (6.7-9.4)	6.3[a] (4.9-7.7)	5.6[a] (3.8-7.4)
Girls	6.1[a] (4.7-7.4)	3.3[a] (2.4-4.5)	6.0[a] (4.9-7.4)	4.4[a] (3.3-5.6)	3.9[a] (2.4-5.4)

Different superscript letters indicate significant differences between boy and girls for each set of references and weight category (z-test, p<0.05). Overweight: >85th and <95th percentile, obesity >95th percentile
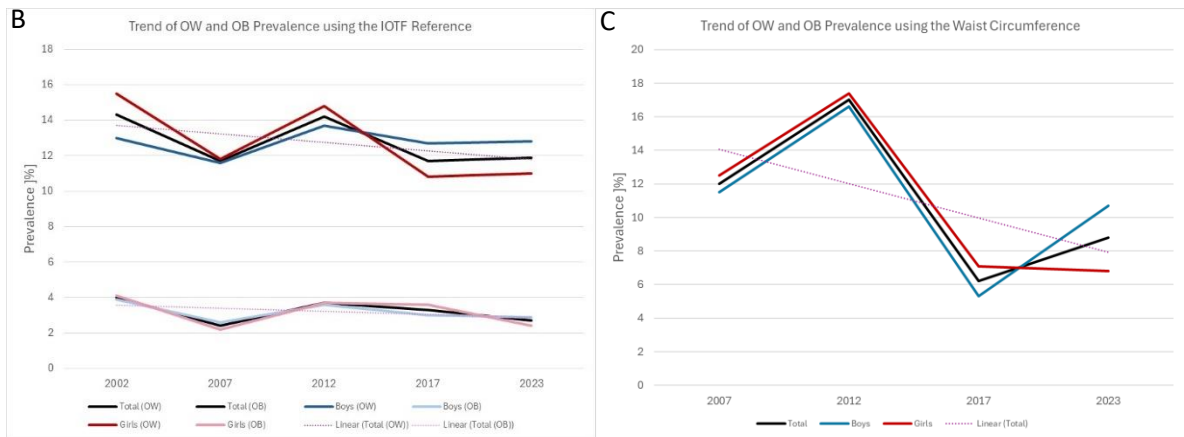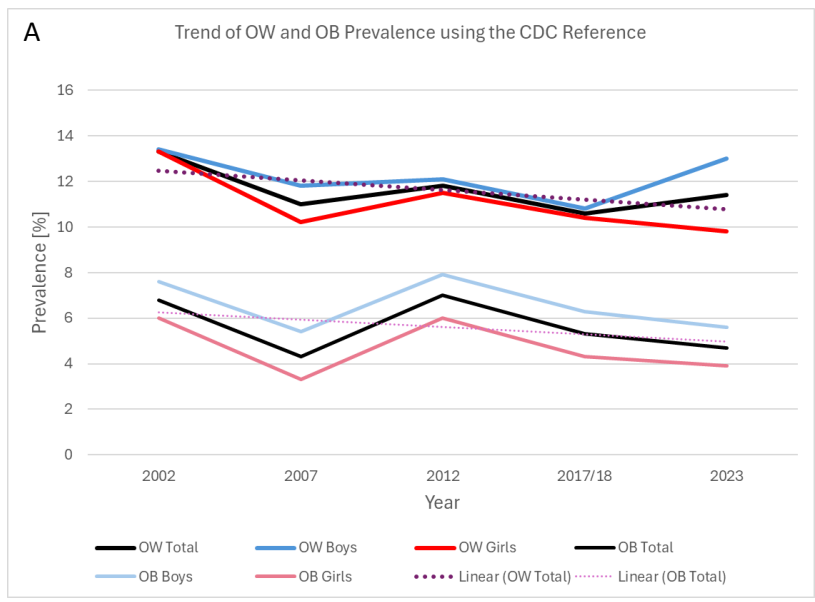
Figure 2 Development of the prevalence of overweight and obesity over time based on national surveys in Switzerland. A) using the CDC reference values; B) using IOTF reference values; and C) using waist circumference reference values. OW: overweight, OB: obesity; blue: boys; red: girls; black: all children

As explained in the methods section, an additional analysis of the prevalence weighted by region was conducted for the 2023 survey. The results of this analysis compared to the unweighted analysis are shown in **Table 6**.

Table 6 Prevalence (% (n)) of overweight and obesity calculated using unweighted data and data weighted by region in a national survey in Switzerland in 2023 (n=1245), based on CDC reference values

	Underweight	Normal weight	Overweight	Obese
	% (n)	% (n)	% (n)	% (n)
Unweighted data				
Boys	3.5 (22)	77.9 (487)	13 (81)	5.6 (35)
Girls	4.5 (28)	81.8 (507)	9.8 (61)	3.9 (24)
Total	4.0 (50)	79.8 (994)	11.4 (142)	4.7 (59)
Weighted data				
Boys	3.7 (23)	78.7 (491)	12.5 (78)	5.1 (32)
Girls	4.7 (29)	81.9 (508)	9.7 (60)	3.7 (23)
Total	4.2 (52)	80.3 (999)	11.1 (138)	4.4 (55)

Since the prevalence of childhood overweight and obesity may be age dependent, we have divided our sample into three age groups for comparison. Prevalence by age group is shown in **Table 7**. There were no significant differences in overweight or obesity between the three age groups.

Table 7 Prevalence (% (95%-CI)) of overweight and obesity **by age group** in 6–12-year-old schoolchildren in Switzerland (n=1245) based on CDC reference values (unweighted data).

	6 to 8 years	9 to 10 years	11 to 12 years
N	446	389	410
Overweight	11.0 [a] (6.8-15.1)	10.0 [a] (5.8-14.2)	8.5 [a] (4.6-12.3)
Obesity	4.1 [a] (1.5-6.7)	5.0 [a] (2.0-8.0)	2.5 [a] (0.3-4.6)

Different superscript letters indicate significant differences between age groups for each weight category (chi-square test followed by z-test (Bonferroni correction for multiple comparisons), p<0.05)

Overweight and obesity prevalence by region is shown in **Table 8**. Even though both overweight and obesity seem to be considerably more common in the Southern region (Ticino), and overweight least prevalent in the Northcentral region, there was no significant difference in the distributions between regions.

Table 8 Prevalence (% (95% CI)) of overweight and obesity **by region** in 6–12-year-old schoolchildren in Switzerland (n=1245) based on CDC reference values (unweighted data).

	Western region	Central and Eastern region	Northcentral region	Northeastern region	Southern region
N	338	208	180	418	101
Overweight	13.6[a] (10.0-17.3)	9.1[a] (5.2-13.0)	11.1[a] (6.5-15.7)	9.3[a] (6.5-12.1)	17.8[a] (10.4-25.3)
Obesity	4.1[a] (2.0-6.3)	3.8[a] (1.2-6.5)	2.2[a] (0.1-4.4)	5.5[a](3.3-7.7)	9.9[a] (3.3-7.7)

Different superscript letters indicate significant differences between regions for each weight category (chi-square test followed by z-test (Bonferroni correction for multiple comparisons), p<0.05).

Population size of the community of residence may influence overweight and obesity prevalences. The prevalence of overweight and obesity by population size of the communities is shown in **Table 9**. While the prevalence of overweight is almost the same in large cities (>100'000 inhabitants) and small communities (<10'000 inhabitants), the prevalence of obesity is highest in the large cities (> 100'000 inhabitants), even though this difference was not significant.

Table 9 Prevalence (% (95% CI)) of overweight and obesity by **community population** size in 6–12-year-old schoolchildren in Switzerland (n=1245) based on CDC references values (unweighted data).

	<10'000 inhabitants	10'000-100'000 inhabitants	>100'000 inhabitants
N	879	118	248
Overweight	11.8[a] (9.7-14.0)	8.5[a] (3.4-13.5)	11.3[a] (7.4-15.2)
Obesity	4.0[a] (2.7-5.3)	4.2[a] (0.6-7.9)	7.7[a] (4.4-11.0)

Different superscript letters indicate significant differences between population size for each weight category (chi-square test followed by z-test (Bonferroni correction for multiple comparisons), $p<0.05$).

We have used three different measures to determine overweight/obesity in the study population and three different cut-offs for BMI. To compare the different values, we are presenting the sensitivity and specificity of WC and BMI cut-offs compared to BF cut-offs in **Table 10**. As we have previously shown the CDC reference values to be better suitable for Swiss children compared to the IOTF references [16] and the analysis in Table 9 also points overall towards a good performance of the CDC references (high specificity with still reasonably high sensitivity), we have done all the analyses related to time trend and risk factors using those.

Table 10 Sensitivity and specificity of the CDC, WHO, IOTF and the WC references for overweight/obesity when compared to the %BF references (unweighted data).

	Sensitivity	Specificity
CDC references		
Overweight+ obesity	80.5%	91.6%
Obesity	84.6%	96.9%
WHO references		
Overweight+ obesity	87.2%	86.7%
Obesity	84.6%	95.7%
IOTF references		
Overweight+ obesity	77.4%	93.0%
Obesity	69.2%	98.8%
WC references		
Increased risk	58.6%	97.3%

Questionnaire and risk factors

To assess potential risk factors for overweight and obesity we used a questionnaire as described above. In total, 1126 children (90.4%), returned the completed questionnaire. In the majority of cases, children completed the questionnaire with the support of their parents (79.1%), while 7.5% of the children completed the questionnaire alone and in 2.5% of the cases the parents completed the

questionnaire. An overview of the answers (frequency (%)) by weight status group is given in **supplementary Table 1**. We used logistic regression models in to investigate the effect of the different potential risk factors on weight status as described earlier.

The **factors showing a significant association** with weight status (as defined using the CDC BMI references) in the individual models, even after correction for multiple comparisons of 11 factors, were **parental origin, parental education, media consumption duration, and the following dietary aspects: sugar sweetened beverages, artificially sweetened beverages, fruits and vegetables and dairy products** (compare **Table 11**). Non-significant factors were: sex, physical activity (number days children are active for at least 1 hour in a week), meat consumption, eating breakfast and sleep duration. Median sleep duration was 10.5 hours in normal weight and overweight children, while it was 10 h in obese children. The median number of days children were physically active for at least 1 hour was 4 in normal weight and overweight children while it was 3 in obese children. The median number of days children played outdoors in a week was 5 in normal weight, 6 in overweight and 4 in obese children. While 80% of the normal weight children reported to regularly perform a specific sport (in a sports club or also private), this number reduced to 70% in overweight and 56% in obese children.

Figure 3 shows the differences in overweight and obesity prevalence by parental origin (A) and parental education (B). The duration of media consumption by weight status is shown in **Figure 4**. Even though the number of days children reported to be physically active was not a significant predictor of weight status in the logistic regression, we have further investigated this aspect by comparing the median number of days children reported to have been active for at least 60 min in the past week. The results were as follows: 4 (3-6) for normal weight, 4 (3-5.75) for overweight and 3 (3-5) for obese children, with a significant difference between normal weight and obese children (p=0.008), but not the other groups.
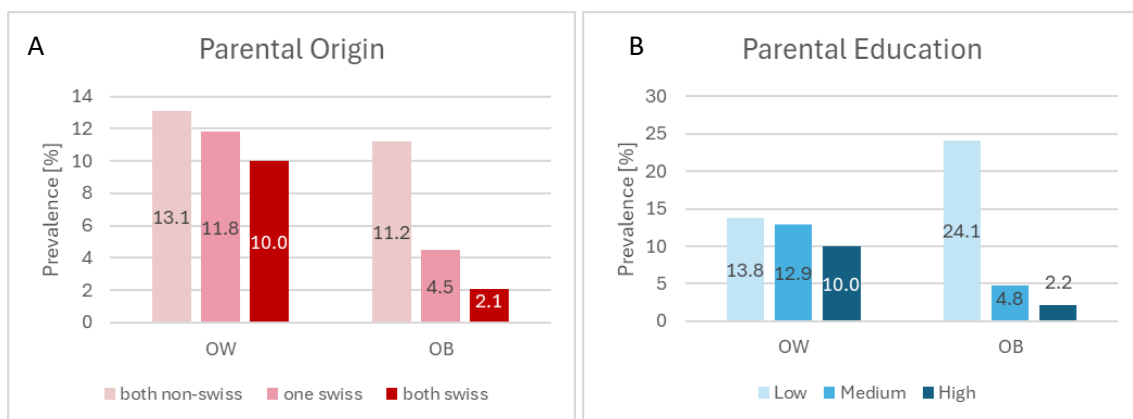
Figure 3 Prevalence of overweight and obesity by parental origin (A) and parental education (B) in a national sample of schoolchildren in Switzerland (n=1126). OW: overweight, OB: obese
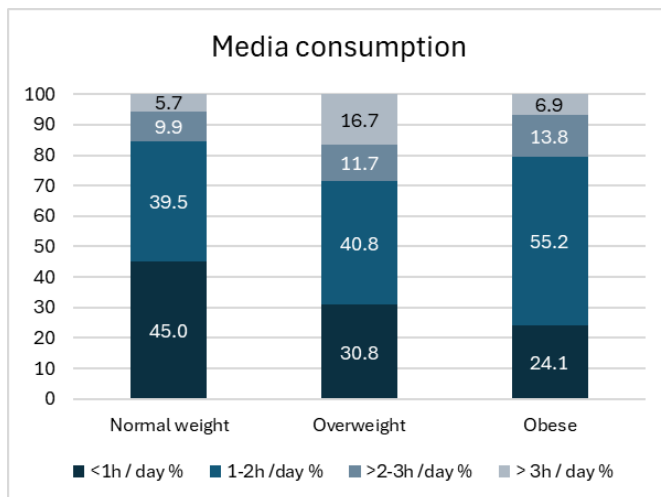
Figure 4 Media consumption duration in a national sample of schoolchildren in Switzerland (n=1126) by weight status. The normal weight group includes also children categorized as underweight.

The factors related to general health were not included in the model but are described in more detail here and in Supplementary table 1. The median life satisfaction (10=best life you can imagine, 1= worst life you can imagine) was 9 in the normal weight and overweight groups and 8.5 in the obese. Of the normal weight children, 82.4% selected a score of 8 or more, while it was 80.3% in the overweight and 65.2% in the obese group. When asked to judge their overall health status (from 1 for very good to 4 for bad), no child judged their health status as bad. The majority of children (65%) chose very good. In the different weight status groups, however, there were some differences: normal weight: 66.7%, overweight 62.5%, obese 35.6%. Nevertheless, 55.6% of the obese children still rated their overall health status as good and only 8.9% as just reasonably good. In the normal weight and overweight categories 31.6% and 33.3% rated their health status as good and 1.7% and 4.2% as reasonably good. Overall, 76.1% of all children thought their weight was about right, in normal weight children this applied to 78.8%, in overweight to 70.3% and in obese to 37% of the children. On the other hand, 54.3% of obese children thought they were a bit heavy as compared to 26.3% of the overweight children and 5.7% of the normal weight children. In this last group, 13.8% thought they were a little too light.

When asked about positive COVID-19 tests, 64.6% of children reported that they had been tested positive at least once (65.9% of normal weight children, 59.5% of overweight children and 52.2% of obese children) and 13.5% were vaccinated against COVID-19 (14.2% in the normal weight, 8.3% in the overweight and 13.0% in the obese group).

Table 11 Univariate analysis of risk factors for overweight and obesity in a national sample of school aged children in Switzerland (n=1126) calculated logistic regression (only factors that were significant are shown). The normal weight reference category also includes children categorized as underweight.

	Normal	Overweight			Obese		
	%	%	OR (95% CI)	P	%	OR (95% CI)	p
Parental origin							
Both CH	*61.5*	*54.1*	*Ref.*	-	*29.2*	*Ref.*	-
CH and non-CH	*21.9*	23.8	1.23 (0.78-1.96)	0.377	22.9	2.21 (0.99-4.93)	0.054
Both non-CH	*16.6*	22.1	1.52 (0.94-2.45)	0.090	47.9	6.09 (3.06-12.11)	<0.001
Parental education							
High	*1.9*	*3.3*	*Ref.*	-	*17.5*	*Ref.*	-
Medium	*33.2*	40.0	1.38 (0.93-2.04)	0.112	45.0	2.34 (1.16-4.71)	0.017
Low	*64.8*	56.7	1.96 (0.64-5.95)	0.236	37.5	15.53 (5.64-42.74)	<0.001
Media consumption							
<1 h per day	*45.3*	*28.6*	*Ref.*	-	*31.9*	*Ref.*	-
1-2 h per day	*39.1*	44.5	1.81 (1.15-2.84)	0.011	46.8	1.70 (0.87-3.32)	0.122
>2-3 h per day	*9.9*	12.6	2.01 (1.05-3.84)	0.034	8.5	1.22 (0.39-3.75)	0.734
≥3 h per day	*5.7*	14.3	4.00 (2.09-7.65)	<0.001	6.9	3.20 (1.19-8.60)	0.021
Sugar sweetened beverages							
≤1 per week	*68.3*	*70.0*	*Ref.*	-	*41.7*	*Ref.*	-
2-6 per week	*21.8*	20.0	0.90 (0.55-1.45)	0.654	29.2	2.20 (1.09-4.42)	0.028
≥1 per day	*9.9*	10.0	0.98 (0.52-1.87)	0.995	29.2	4.81 (2.35-9.85)	<0.001
Artifically sweetened beverages							
≤1 per week	*93.7*	*90.0*	*Ref.*	-	*80.9*	*Ref.*	-
2-6 per week	*3.9*	9.2	2.44 (1.21-4.92)	0.013	12.8	3.78 (1.50-9.49)	0.005
≥1 per day	*2.4*	0.8	0.36 (0.05-2.67)	0.315	6.4	3.04 (00.87-10.56)	0.081
Fruits and vegetables							
≥5 per day	*12.9*	*8.2*	*Ref.*	-	*6.3*	*Ref.*	-
2-4 per day	*74.3*	80.3	1.70 (0.86-3.34)	0.127	64.6	1.79 (0.54-5.94)	0.343
≤1 per day	*12.9*	11.5	1.40 (0.60-3.27)	0.438	29.2	4.67 (1.31-16.65)	0.018
Dairy products							
≥1 per day	*66.2*	*62.0*	*Ref.*	-	*39.6*	*Ref.*	-
2-6 per week	*26.3*	26.4	1.07 (0.69-1.66)	0.757	47.9	3.04 (1.63-5.68)	<0.001
≤1 per week	*7.5*	11.6	1.65 (0.89-3.07)	0.114	12.5	2.79 (1.08-7.22)	0.034

The frequency of different diseases and disorders asked in the questionnaire are reported in **Table 12**.

Table 12 Frequency of different diseases and disorders reported by school aged children in Switzerland (n=1126)

	UW	NW	OW	OB
Physical disability	1 (2.1%)	12 (1.4%)	3 (2.5%)	1 (2.2%)
Asthma	3 (6.4%)	41 (4.6%)	6 (5%)	4 (8.5%)
Diabetes	0 (0%)	5 (0.5%)	1 (0.8%)	0 (0%)
Hey fever	8 (17%)	124 (14.1%)	19 (15.8%)	9 (19.1%)
ADHS	4 (8.5%)	40 (4.6%)	7 (5.8%)	3 (6.4%)
Shortsightedness	4 (8.5%)	98 (11.1%)	14 (11.7%)	4 (8.5%)
Coeliac disease	0 (0%)	3 (0.3%)	0 (0%)	0 (0%)
Eating disorder	0 (0%)	1 (0.1%)	1 (0.8%)	2 (4.3%)

Discussion

Sample

Already in the 2017/2018 survey it had become difficult to recruit a sufficient number of schools and children willing to participate in the survey. Nevertheless, at that time we did succeed in including the required 60 schools and almost 2500 children. In the present survey, however, despite contacting 690 schools, only 33 agreed to take part in the study. In comparison, in 2017/18 we had contacted 491 schools to recruit the 60 schools. In several of the cluster we have contacted all available schools and were therefore unable to reach out to any more. Thus, it seems to become more and more impossible to conduct this kind of survey using the described recruitment strategy. For future studies a different recruitment approach would need to be envisaged. Besides the low willingness of schools to participate in surveys, the response rate amongst the invited children has also been steadily declining over the past two decades (with the exception of the year 2012, where we were able to use the passive consent procedure) from around 75% to <50%. With such a low response rate amongst invited children, it is difficult to ensure the representativeness of our sample. In order to ensure as little bias as possible with regards to the weight status of the participating children, we have been careful not to focus the information letter on overweight or obesity. The study was introduced as a health and nutrition survey which included anthropometric measurements. Nevertheless, we did receive feedback from some teachers that they had the impression that particularly the overweight children did not participate in the study. However, those statements were not collected in a systematic way and were purely based on the teacher's impression as no data is available on the non-participating children and no reason had to be given for not participating. Nevertheless, one reason for parents not to consent to the participation of an overweight child to the study could have been the fear of stigmatization by peers. How big an impact on the consent of the parents the weight status of the children has is debated, even though an earlier study found that active and passive consent lead to similar prevalence estimates, thus indicating no such bias [33]. Still, based on the low response rate we cannot exclude a certain bias within our data. This is also supported by the fact that both overweight

and obesity prevalence was in the survey from 2012, where we used passive consent procedures and had a response rate of >95%, compared to all other surveys.

Overweight/obesity prevalence and time trend

Our time trend analysis showed a small but significant decrease in the prevalence of overweight including obesity but no significant trend for obesity alone. When looking at Figure 2, it becomes clear that the decreasing trend in overweight including obesity was driven by a decrease in girls, while the prevalence seems to have increased in boys. A similar development was observed in the HBSC survey between 2018 and 2022, where the prevalence of overweight including obesity also increased in 11 year old boys (from 9.3 to 14.2%) but not in girls (7.6 and 7.8%){Balsiger, 2023 #4685}. Thus, the decreasing trend needs to be interpreted with caution and can probably more be considered as a continued stabilization. Such a stabilizing trend has previously been reported from different countries and regions [14; 19; 20; 34; 35]. The WHO COSI report on round 5 (data collection 2018-2020) reports a decrease in the prevalence of overweight compared to round 4 (data collection 2015-2017) in some countries but an increase in others [14], but most of the changes were not significant. Thus, also the 29 countries included in this report seem to show a stabilizing trend in childhood overweight. What is interesting to note is, that the prevalence of overweight including obesity in Switzerland (21.2 % using WHO references), is lower compared to most (all but two) of the 29 countries included in the report [14]. The values from our current study are comparable to data collected by the BMI monitoring Switzerland in the cities of Zurich, Bern, and Basel. The BMI monitoring of Health Promotion Switzerland reported a prevalence of overweight including obesity of 12.0% in the younger age group (Basisstufe) and of 19.0% in the older age group (Mittelstufe) in the period 2017/18-2022/23, using the IOTF references [36]. In comparison, our results based on the IOTF data reported a prevalence of overweight including obesity of 14.6% in 6- to 12-year-old children, which should include the two age groups above.

In order to account for the imbalanced sampling in the current survey, we have, in addition to the unweighted analysis as conducted in all previous surveys, also conducted an analysis of prevalence with data weighted by region. The difference in the prevalence of underweight, overweight and obesity between the two analyses, however, was minimal and would not have influenced the interpretations. We therefore conclude that the unbalanced sampling caused by the low response rate did not influence the prevalence estimates of the current survey.

Risk factors for overweight and obesity

Similar to the last two surveys in 2012 and 2017/18, we have tried to identify the most important predictors for overweight and obesity using a questionnaire assessing dietary and lifestyle habits as well as some socioeconomic data. Comparable to those earlier surveys, we have identified parental education and parental origin as important predictors of childhood overweight and particularly obesity. While the risk for being obese was almost 5-fold for a child with two parents on non-Swiss origin compared to a child with two Swiss parents, it was almost 7-fold if parents had a low education

compared to a high education. This is a pattern seen not only in Switzerland but also in other highly developed countries. It therefore remains of utmost importance, that prevention programs address families with migration background and/or low education where the impact can be expected to be the greatest. On the other hand, contrary to the previous study, the number of days children were physically active according to the recommendations (1 hour per day), was not a significant predictor of childhood overweight or obesity. However, in the present survey, media consumption duration, as a proxy for sedentary behavior, remained as a significant predictor of overweight after correcting for multiple comparisons. This finding is comparable to the 2012 survey, where media consumption was already identified as an important risk factor. We cannot clearly say why the number of days children were physical active for at least 1 hour was not a significant factor in the current survey while sedentary behavior was. However, since children are away at school and after school care a lot during the week it may be rather difficult for parents to judge this which can lead to a higher variability in the final value. Due to the smaller sample size in the current survey, this may therefore not have remained a significant factor. Nevertheless, the reported median number of day children were physically active in a week and the number of days the play outdoors was lower in obese children compared to the two other groups, while there was no difference between normal weight and overweight children for the former, and even a higher value in overweight for the latter. Again, the small sample size especially in the obese group may have obscured these differences.

Contrary to the previous studies, several dietary factors remained significant predictors of overweight and/or obesity in the current study. Children consuming artificially sweetened beverages 2-6 times per week showed a higher risk for both overweight and obesity compared to those consuming them up to once per week, while there was no difference between children consuming them once per day or up to once per week. However, it is difficult to judge whether this is a causal relationship or rather a behavior which developed when the children were already overweight or obese.. Another interesting finding is, that children consuming fruits and vegetables less than once per day had a more than 9-fold increased risk of being obese compared to those consuming those products more than 5 times per day, while there was no significant effect on overweight. Furthermore, children consuming dairy products 2-6 times per week had a 2.5-fold increased risk for obesity compared to those consuming dairy products more than once per day. Nevertheless, when interpreting those results it needs to be kept in mind, that samples sizes especially in the obese groups were relatively small which may have led to a small number of children with a specific behavior influencing the results. Still, the current results do demonstrate the importance of nutrition in the development of childhood overweight or obesity, but also the fact that the interpretation of the results is not always straightforward and that overall nutrition needs to be considered and not only individual foods or food groups. Sleep duration is another important factor repeatedly associated with overweight and obesity. However, median sleep duration was very similar between the normal weight and overweight groups in our study, while only the obese children reported a somewhat lower sleep duration. Nevertheless, also in this group, a total of 87% of children slept 9 hours or more per night during the week.

Reference values

When comparing data on overweight and obesity prevalence in children it is important to know how the data was calculated and which reference curves were used. We have calculated the prevalence of overweight and obesity for our current study based on three different BMI reference values, namely those from the CDC, IOTF and WHO. Each of those references was created in a different way, using different population groups and different methods. In line with the previous survey, the results show comparable values for overweight between CDC and IOTF while the obesity prevalence is considerably lower when using the IOTF references. This is in line with our previous findings where we showed that compared to data as assessed using BF% the IOTF references underestimated obesity prevalence [16]. When looking at the overweight and obesity prevalence calculated using WHO references, those estimates are higher compared to both CDC and IOTF. The combined prevalence of overweight and obesity was 16.1% for CDC, 14.6% for IOTF and 21.2% for WHO. These differences again indicate the importance of only comparing values calculated using the same reference curves. We have also determined overweight and obesity using BF% as measured by skinfold thicknesses and national reference curves defined using our study population in 2002 [15]. These values were the lowest of all and indicated a prevalence of overweight including obesity of only 10.7%. However, we have seen some inconsistencies in the measurements of %BF in the different survey years which point towards methodological issues. Especially the suprailiacal site for skinfold measurement is challenging to measure. The values measured in the current survey for this site averaged at 7.8 mm, while in the past survey in 2017/18, the average was 14.9 mm, while the measurements at all other sites were comparable. These differences occurred despite careful instructions and training of all investigators by the same experienced researcher. Similarly, discrepancies in the WC results over the years were observed. In this case specifically the year 2012 seemed to be affected, where central adiposity was diagnosed in 46% and 37% of 6- and 7-year-old children while they were considerably lower in all other survey (6-15%). Nevertheless, we have conducted a time-trend analysis using the WC data, but those results should be interpreted with caution. When looking at Figure 2C, it becomes apparent, that WC was considerably higher in 2012 compared to all other surveys. However, the time-trend still shows a declining direction over the entire period, even a little stronger than for BMI.

As in previous comparisons, the specificity of the WHO BMI references to determine overweight compared to %BF was lowest (87%). Thus, 13% of the children classified as normal weight by the %BF criteria were classified as overweight or obese by the WHO BMI criteria. Specificity of the other comparisons varied between 92% and 99%. The variability in sensitivity was much more pronounced, ranging from 59% (WC increased risk) to 87% (WHO overweight including obesity). Thus, the WC references failed to identify 40% of the children identified as obese using the %BF references. However it needs to be considered, that the WC reference was set at 90%, while the %BF obesity reference at 95%. Nevertheless, the classifications by BMI seem to be closer to those by %BF then WC. Considering the remarks at the end of the previous paragraph, however, the results of sensitivity and specificity need to be interpreted with caution.

Strengths and limitations

Our study has several strengths and limitations. Using the PPS cluster sampling we aimed to select a representative sample of school aged children in Switzerland. Because of the low response rate of the schools, however, it was not possible to complete the PPS cluster sampling, which may lead to a less representative sample. The low response rate both in schools but also children of selected schools has further led to an overall sample size of only ca. 50% of the planned sample size. These two facts may further have introduced a certain selection bias between consenting and not consenting schools as well as children.

The questionnaire to assess risk factors was self-administered. Even though we asked children to complete the questionnaire at home with the help of their parents, we cannot be sure this was always the case. Furthermore, estimating habitual physical activity or media consumption but also food intake is challenging and may have led to over- or underestimation.

For the anthropometric assessments, our study teams have personally visited all participating schools and have collected data that is comparable between schools. Besides anthropometric data, using the questionnaire, we collected data on physical activity, sport, playing outside, dietary habits, sleep duration, media consumption duration as well as general health and socioeconomic background of the children. This allows us to not only interpret the weight status itself, but also relate it to potential risk factors. As described previously, despite careful instructions and trainings, WC and %BF measurements remain challenging in the school setting and have led to inexplicable variabilities between some of the survey years. Furthermore, we had some reports about children having been afraid of the SFT measurements and therefore not participating in the survey. To simplify the procedures and achieve more robust results, we would therefore recommend to stick to weight and height measurements in future surveys.

To conclude, we have shown a weak but significant decreasing trend in the prevalence of overweight including obesity, but not of obesity on its own, in 6- to 12-year-old children in Switzerland over the past 21 years. Nevertheless, with 16% of overweight including obesity, the prevalence remains a public health concern. The most important predictors for the development of overweight or obesity were parental origin and education, which media consumption and several dietary factors also making a significant, but less consistent contribution. Furthermore, we have again shown that overweight is much more prevalent in boys compared to girls, not only using BMI for classification, but also WCThus, obesity prevention should continue to focus on population groups with a migration background and/or lower education levels and especially address boys. A further aspect to tackle could be sedentary behavior and nutrition education should be strengthened already at an early age in order for the children to develop healthier eating patterns from an early age.

Acknowledgements

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Appendix

Supplementary Table 1 Frequencies (n (%))of answers given to the questions related to COVID19 as well as health perception in self administered questionnaire by weight status group (based on CDC reference values).

Supplementary Table		Normal weight (incl underweight)		Overweight		Obese	
		n	%	n	%	n	%
COVID							
Covid-Vaccine							
	No	805	84.2	111	11.6	40	4.2
	Yes	133	89.3	10	6.7	6	4.0
Positive Covid-Test	No	319	81.8	49	12.6	22	5.6
	Yes	616	86.5	72	10.1	24	3.4
Did Covid Influence your life?							
	No	830	84.7	108	11.0	16	4.3
	Yes	110	83.3	42	12.1	6	4.5
	Yes, physically	43	82.7	7	13.5	2	3.8
	Yes, psychologically	35	89.7	1	2.6	3	7.7
	Yes, lifestyle	45	81.8	7	12.7	3	5.5
	Yes, other	16	69.6	4	17.4	3	13.0
Working parents							
	both	804	85.8	100	10.7	33	3.5
	only father	113	83.7	13	9.6	9	6.7
	only mother	14	63.6	4	18.2	4	18.2
	none	4	40.0	4	20.0	2	20.0
Nr of days physically active per week							
	≤1 d/week	60	76.9	13	16.7	5	6.4
	2-3 d/week	256	81.8	36	11.5	21	6.7
	4-5 d/week	332	85.3	44	11.3	13	3.3
	≥6 d/week	293	88.3	31	9.3	8	2.4
Nr of days playing outdoors per week							
	≤1 d/week	42	77.8	6	11.1	6	11.1
	2-3 d/week	178	82.4	25	11.8	13	6.0
	4-5 d/week	273	86.7	28	8.9	14	4.5
	≥6 d/week	460	85.2	65	12.0	15	2.8
Regular sport							
	Yes	835	86.3	99	10.2	33	3.4
	No	119	74.8	25	15.7	15	9.4

Supplementary Table 1 continued

Supplementary Table	Normal weight (incl. Underweight)		Overweight		Obese	
	n	%	n	%	n	%
Sleep duration (week)						
≤9 h	47	83.9	3	5.4	6	10.7
>9-10 h	318	83.9	43	11.3	18	4.7
>10-11 h	482	85.8	60	10.7	20	3.6
>11 h	69	80.2	15	17.4	2	2.3
Disease						
Physically disabled	13	76.5	3	17.6	1	5.9
Asthma	44	81.5	6	11.1	4	7.4
Diabetes	5	83.3	1	16.7	0	0.0
Hay fever	132	82.5	19	11.9	9	5.6
ADHD	44	81.5	7	13.0	3	5.6
Myopia	102	85.0	14	11.7	4	3.3
Celiac disease	3	100.0	0	0.0	0	0.0
Eating disorder	1	25.0	1	25.0	2	50.0
Weight perception						
much too thin	13	92.9	1	7.1	0	0.0
a bit to thin	129	98.5	2	1.5	0	0.0
about the right weight	738	88.1	83	9.9	17	2.0
a bit to fat	53	48.6	31	28.4	25	22.9
way too fat	4	44.4	1	11.1	4	44.4
Health perception						
Excellent	626	87.3	75	10.5	16	2.2
Good	296	82.0	40	11.1	25	6.9
Fair	16	64.0	5	20.0	4	16.0
Bad	0	0.0	0	0.0	0	0.0
Life satisfaction						
9-10	541	86.1	64	10.2	23	3.7
6-8	365	84.7	46	10.7	20	4.6
≤5	33	76.7	7	16.3	3	7.0

Questionnaires

In the following section, the three questionnaires used in the survey (German, Italian, and French) are displayed.

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institut für Lebensmittelwissenschaften, Ernährung und Gesundheit

Labor für Ernährung und Metabolische Epigenetik

Probandennummer: _____

Nationale Studie Gesundheit und Ernährung von Primarschülern 2023

Fragebogen

Erfassungsdatum: |__|__|.|__|__|.|__|__|__|__|

1. Geburtsjahr: |__|__|__|__|

2. Geschlecht: ☐ Junge   ☐ Mädchen

I. Körperliche/sportliche Aktivität

3. Wie viel Spass macht Dir körperliche Bewegung (sowie rennen, mit einem Ball spielen, rumhüpfen)?

Gar keinen Spass	Ein wenig Spass	Viel Spass	Weder noch
☐	☐	☐	☐

4. An wie vielen der letzten 7 Tage warst Du für mindestens 60 min <u>körperlich aktiv</u>*?
Zähle die gesamte Zeit zusammen, die Du an jedem dieser Tage mit körperlichen Aktivitäten verbringst, die Bewegungszeit in der Schule nicht miteingeschlossen.

0 Tage	1	2	3	4	5	6	7 Tage
☐	☐	☐	☐	☐	☐	☐	☐

* Hier geht es um alle Tätigkeiten, bei denen das **Herz schneller schlägt**, für einige Zeit die **Atmung erhöht** ist, und man **etwas zum Schwitzen** kommt. Beispielsweise Sport, Laufen, Fangen spielen, anstrengendes Wandern, Rollschuh fahren, Rad fahren, Tanzen, Schwimmen, Fussball spielen, usw.

5. Wie häufig spielst Du pro Woche in der Regel im Freien (z.B. Fangen spielen, Gummitwist, ins Schwimmbad gehen,…)?

Täglich	6x	5x	4x	3x	2x	1x	nie
☐	☐	☐	☐	☐	☐	☐	☐

6. Wie lange spielst Du an jedem dieser Tage durchschnittlich im Freien?
Ca. _____ Minuten pro Tag

7. Betreibst Du eine Sportart? (im Verein oder privat, jedoch regelmässig)

Ja	Nein
☐	☐

Falls ja:

Welche Sportart(en) betreibst Du?	Wie häufig betreibst Du diese Sportart pro Woche?	Wie lange dauert das Training (Ohne Wegzeit, Umziehen und Duschen)?
1._____ (Sportart)	_____ mal pro Woche	_____ min pro Training
2._____ (Sportart)	_____ mal pro Woche	_____ min pro Training
3._____ (Sportart)	_____ mal pro Woche	_____ min pro Training

8. Treiben Deine Eltern mit Dir zusammen Sport?

Nie	Selten	Häufig	Immer
☐	☐	☐	☐

9. Bitte gib an, ob und wie lange Du am **letzten vollständigen Schultag** Sport gemacht oder Dich bewegt hast. Hast Du Dich…

	Nein	Ja					
		1-15 min	16-30 min	31-60 min	1-2 h	2-3 h	mehr als 3 h
auf dem Schulweg bewegt (zu Fuss, mit dem Velo, Skate- oder Kickboard)?	☐	☐	☐	☐	☐	☐	☐
beim obligatorischen oder freiwilligen Schulsport bewegt?	☐	☐	☐	☐	☐	☐	☐
während dem Unterricht bewegt (z.B. gemeinsame Bewegungspausen)?	☐	☐	☐	☐	☐	☐	☐
während den Pausen bewegt?	☐	☐	☐	☐	☐	☐	☐
beim Sport ausserhalb der Schule bewegt (z.B. im Verein Sport gemacht oder mit Freunden gespielt)?	☐	☐	☐	☐	☐	☐	☐
bei anderen Aktivitäten bewegt (z.B. im Haushalt helfen, gärtnern)?	☐	☐	☐	☐	☐	☐	☐

II. Essverhalten

10. Frühstückst Du normalerweise (mehr als ein Glas Milch oder Fruchtsaft)?

Unter der Woche	☐ Ja	☐ Nein
Am Wochenende	☐ Ja	☐ Nein

11. Wie oft hast Du in den letzten vier Wochen folgendes getrunken oder gegessen?
   Bitte kreuze jeweils nur eine Antwort pro Zeile an!

	Selten - nie	1-3x / Monat	1x / Woche	2-4x / Woche	5-6x / Woche	1x / Tag	2x / Tag	3x / Tag	4x / Tag	5x / Tag
Süssgetränke mit Zucker (z.B. Cola, Eistee, Capri Sonne usw.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Süssgetränke künstlich gesüsst (z.B. light und Zero)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Frucht- oder Gemüsesaft	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Früchte/ Obst	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Gemüse inkl. Salat	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Milch und Milchprod. (Käse, Joghurt, etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fleisch, Wurst, Fisch	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. Wie häufig isst Du normalerweise zusammen mit Deiner Familie?
   - ☐ jeden Tag
   - ☐ mehrmals pro Woche
   - ☐ etwa einmal pro Woche
   - ☐ weniger häufig
   - ☐ nie

13. Welche der folgenden Produkte isst Du am häufigsten zum Znüni und zum Zvieri?
   Kreuze maximal je 3 Produkte an.

	Znüni	Zvieri
Ich esse kein	☐	☐
Brot, Blevita, Darvida, Mais-/Reiswaffeln	☐	☐
Frische Früchte oder Gemüse	☐	☐
Käse	☐	☐
Wurst (Minipic, Lyoner, Salami, Schinken)	☐	☐
Nüsse	☐	☐
Getrocknete Früchte	☐	☐
Getreideriegel (Farmer etc.)	☐	☐
Joghurt oder Milch(-getränke)	☐	☐
Süsse Guetzli, Nussgipfel, Kuchen etc.	☐	☐
Süssigkeiten (Bonbons, Schokolade)	☐	☐
Chips, Tuc	☐	☐
Anderes, nämlich: _____	☐	☐

III. Medienkonsum

14. Wieviel Zeit verbringst Du durchschnittlich **pro Tag** in der Freizeit vor einem Bildschirm?
    Denke hier an alle Geräte mit Bildschirm: **Laptop, Desktop Computer, Tablet/iPad, Smartphone, Fernseher, Spielkonsole (Xbox, Play Station, PSP, Nintendo, Nintendo Switch, Gameboy…), E-Buch/E-Reader).**

    Unter der Woche: ca. _____Stunden/Tag (**ODER** ca. _____ Minuten/Tag)*

    Am Wochenende: ca: _____Stunden/Tag (**ODER** ca. _____ Minuten/Tag)*

    *Falls nicht an jedem Tag Zeit vor einem Bildschirm verbracht wird, bitte so genau wie möglich als Bruchteil angeben. Z.B. ½ Stunde an 3 Tagen (=total 90 min) unter der Woche als ca. 1/3 Stunde pro Tag angeben (90 min/5=18 min=ca 1/3 Stunde).

IV. Schlaf und Gesundheit

15. Um welche Zeit gehst Du normalerweise zu Bett?   unter der Woche: _____ Uhr

                                                       am Wochenende: _____ Uhr

16. Wann stehst Du normalerweise auf?   unter der Woche: _____ Uhr

                                         am Wochenende: _____ Uhr

17. Hast Du jemals von einem Arzt oder einer Ärztin eine der folgenden Diagnosen (Untersuchungsergebnisse) erhalten?

	Ja	Nein
körperliche Behinderung	☐	☐
Asthma	☐	☐
Diabetes (Typ 1 oder Typ 2)	☐	☐
Heuschnupfen	☐	☐
Aufmerksamkeitsdefizitstörung mit oder ohne Hyperaktivität (ADHS, ADS)	☐	☐
Kurzsichtigkeit (ich sehe schlecht in die Weite)	☐	☐
Zöliakie	☐	☐
Essstörungen (Magersucht, Ess-Brech-Sucht, Essanfallstörung)	☐	☐

18. Wie würdest Du Deinen Gesundheitszustand beschreiben?
    ☐ Ausgezeichnet
    ☐ Gut
    ☐ Einigermassen gut
    ☐ Schlecht

19. Die folgenden Fragen betreffen Dein Wohlbefinden in den letzten zwei Wochen. Bitte kreuze bei jeder Aussage an was am besten beschreibt, wie Du Dich in den letzten zwei Wochen gefühlt hast.

In den letzten zwei Wochen…	Die ganze Zeit	Meistens	Etwas mehr als die Hälfte	Etwas weniger als die Hälfte	Ab und zu	Nie
war ich froh und guter Laune	☐	☐	☐	☐	☐	☐
Habe ich mich ruhig und entspannt gefühlt	☐	☐	☐	☐	☐	☐
Habe ich mich voll Energie und aktiv gefühlt	☐	☐	☐	☐	☐	☐
Habe ich mich beim Aufwachen frisch und ausgeruht gefühlt	☐	☐	☐	☐	☐	☐
War mein Alltag voller Dinge, die mich interessieren	☐	☐	☐	☐	☐	☐

20. Denkst Du, dass Du:

☐ Viel zu dünn bist?

☐ Ein bisschen zu dünn bist?

☐ Ungefähr das richtige Gewicht hast?

☐ Ein bisschen zu dick bist?

☐ Viel zu dick bist?

21. Wo stehst Du auf dieser Leiter wenn Du Dein derzeitiges Leben betrachtest?
Die oberste Sprosse '10' bedeutet das Beste für Dich erdenkliche Leben. Der Boden '0' bedeutet das schlechteste mögliche Leben.
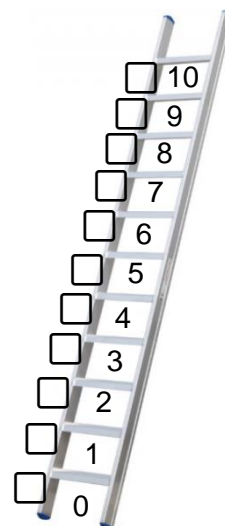
V. Covid-19

Bitte denke an die Zeit während der Corona Pandemie zurück…

22. Wurdest Du jemals positiv auf Covid-19 getestet?

(ein positives Testresultat bedeutet dass Du Covid-19 hattest)　　☐ ja　☐ nein

23. Bist Du gegen Covid-19 geimpft? ☐ ja ☐ nein

24. Hat die Corona-Pandemie (sei es durch eine Covid-19 Erkrankung, die Impfung, oder die Pandemiesituation selbst) einen Einfluss auf Deine Gesundheit gehabt?

    ☐ Ja   ☐ Nein

Falls ja: bitte alle zutreffenden ankreuzen

    ☐ körperliche Auswirkung

    ☐ Seelische/Psychische Auswirkung

    ☐ Auswirkung auf Ernährung, Bewegung, Medienkonsum

    ☐ Andere Auswirkung

VI. Allgemeine Fragen

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25. Wie lange lebst Du schon in der Schweiz

    ☐ Schon immer   ☐ seit >5 Jahren   ☐ 1-5 Jahren   ☐ seit <1 Jahre

26. In welchem Land bist Du geboren?

    ☐ In der Schweiz

    ☐ In einem anderen Land, nämlich: _____

27. In welchem Land sind Deine Eltern geboren?

MUTTER   VATER

    ☐ In der Schweiz   ☐ In der Schweiz

    ☐ In einem anderen Land, nämlich: ☐ In einem anderen Land, nämlich:

    _____   _____

28. Was ist der höchste Berufs-/Schulabschluss Deiner Eltern? **Bitte für beide ausfüllen!**

MUTTER: VATER:

    ☐ Obligatorische Schulzeit   ☐ Obligatorische Schulzeit

    ☐ Lehre   ☐ Lehre

    ☐ Lehre mit Berufsmatur   ☐ Lehre mit Berufsmatur

    ☐ Fachhochschule, Technikum   ☐ Fachhochschule, Technikum

    ☐ Universität   ☐ Universität

    ☐ Anderes _____   ☐ Anderes _____

29. Sind Deine Eltern zurzeit berufstätig? **Bitte für beide ausfüllen!**

MUTTER: VATER:

    ☐ Ja _____%   ☐ Nein   ☐ Ja _____%   ☐ Nein

30. Wer hat den Fragebogen ausgefüllt?   ☐ Kind   ☐ Eltern   ☐ beide zusammen

Vielen Dank für die Teilnahme!

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institut für Lebensmittelwissenschaften, Ernährung und Gesundheit

Labor für Ernährung und Metabolische Epigenetik

Numero del/la partecipante: _____

Studio nazionale sulla salute e sulla nutrizione dei bambini delle scuole elementari 2023

Questionario

Data di compilazione: |__|__|.|__|__|.|__|__|__|__|

1. Anno di nascita: |__|__|__|__|
2. Sesso: ☐ Maschio   ☐ Femmina

I. Attività fisica/sportiva

3. Quanto ti diverte fare attività fisica (ad esempio correre, giocare con un pallone, saltare)?

Non mi diverte per niente	Mi diverte un poco	Mi diverte molto	Nessuna di queste risposte
☐	☐	☐	☐

4. In quanti degli ultimi 7 giorni hai fatto <u>attività fisica</u> per almeno 60 minuti*? **Somma il tempo totale in cui sei stato fisicamente attivo in ciascuno di questi giorni**, senza contare il tempo di attività fisica a scuola.

0 Giorni	1	2	3	4	5	6	7 Giorni
☐	☐	☐	☐	☐	☐	☐	☐

*Qui si tratta di qualsiasi attività in cui il **cuore batte più velocemente**, la **respirazione aumenta** per un po' di tempo e si **suda un po'**. Ad esempio lo sport, la corsa, il giocare a prendersi, la camminata faticosa, il pattinaggio a rotelle, il ciclismo, la danza, il nuoto, il calcio, ecc.

5. Quante volte alla settimana giochi normalmente all'aperto (ad esempio giocare a prendersi, saltare all'elastico, andare in piscina,…)?

Ogni giorno	6 volte	5 volte	4 volte	3 volte	2 volte	1 volta	Mai
☐	☐	☐	☐	☐	☐	☐	☐

6. Per quanto tempo giochi all'aperto in media in ciascuno di questi giorni?
   Ca. _____ minuti al giorno

7. Pratichi uno sport? (in una società sportiva o in privato, tuttavia regolarmente)

Sì	No
☐	☐

Se sì:

Quale o quali sport pratichi?	Quante volte alla settimana pratichi questo sport?	Quanto dura l'allenamento (senza contare il tragitto, il cambiarsi e la doccia)?
1._____ (tipo di sport)	____ volte alla settimana	____ minuti per allenamento
2._____ (tipo di sport)	____ volte alla settimana	____ minuti per allenamento
3._____ (tipo di sport)	____ volte alla settimana	____ minuti per allenamento

8. I tuoi genitori praticano sport con te?

Mai	Raramente	Spesso	Sempre
☐	☐	☐	☐

9. Indica per favore se e per quanto tempo hai praticato sport o attività fisica durante **lo scorso intero giorno di scuola.** Hai…

| | No | Sì | | | | | |
		1-15 minuti	16-30 minuti	31-60 minuti	1-2 ore	2-3 ore	Più di 3 ore
fatto movimento durante il tragitto verso la scuola (a piedi, in bicicletta, con lo skateboard, con il monopattino)?	☐	☐	☐	☐	☐	☐	☐
fatto movimento durante lo sport scolastico obbligatorio o facoltativo?	☐	☐	☐	☐	☐	☐	☐
fatto movimento durante le lezioni (ad esempio delle pause attive in cui ci si muove insieme)?	☐	☐	☐	☐	☐	☐	☐
fatto movimento durante le ricreazioni?	☐	☐	☐	☐	☐	☐	☐
praticato sport al di fuori della scuola (ad esempio in una società sportiva o giocando con degli amici)?	☐	☐	☐	☐	☐	☐	☐
fatto movimento durante altre attività (ad esempio aiutando nelle faccende domestiche, giardinaggio)?	☐	☐	☐	☐	☐	☐	☐

II. Comportamento alimentare

10. Normalmente fai colazione (più di un bicchiere di latte o di succo di frutta)?

| Durante la settimana | ☐ Sì ☐ No |
| Nel fine settimana | ☐ Sì ☐ No |

11. Nelle ultime quattro settimane, quanto spesso hai bevuto o mangiato i seguenti prodotti?

Per favore metti solo una crocetta per riga!

	Raramente - mai	1-3 volte/ mese	1 volta/ settimana	2-4 volte/ settimana	5-6 volte/ settimana	1 volta/ giorno	2 volte/ giorno	3 volte/ giorno	4 volte/ giorno	5 volte/ giorno
Bevande dolci con zucchero (ad es. Coca Cola, tè freddo, Capri Sonne, ecc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bevande dolci con dolcificanti artificiali (ad es. light e zero)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Succhi di frutta o di verdura	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Frutta	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Verdura, inclusa l'insalata	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Latte e latticini (formaggio, yogurt, ecc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Carne, insaccati, pesce	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. Quanto spesso mangi con la tua famiglia normalmente?

☐ ogni giorno

☐ più volte alla settimana

☐ circa una volta alla settimana

☐ meno spesso

☐ mai

13. Quali dei seguenti prodotti mangi più spesso durante lo spuntino del mattino e del pomeriggio?
Seleziona ogni volta al massimo 3 prodotti.

	Spuntino del mattino	Spuntino del pomeriggio
Non mangio niente	☐	☐
Pane, crackers, gallette di mais/riso	☐	☐
Frutta o verdura fresca	☐	☐
Formaggio	☐	☐
Insaccati (Minipic, salsiccia di Lione, salame, prosciutto)	☐	☐
Noci	☐	☐
Frutta secca	☐	☐
Barrette ai cereali (Farmer, ecc.)	☐	☐
Yogurt o latte/bevande a base di latte	☐	☐
Biscotti dolci, Gipfel alle nocciole, torte, ecc.	☐	☐
Dolci (caramelle, cioccolato)	☐	☐
Chips, Tuc	☐	☐
Altro, specificare: _____	☐	☐

III. Consumo dei media

14. Quanto tempo trascorri mediamente **al giorno** nel tempo libero davanti a uno schermo?
    Pensa a qualsiasi dispositivo che usi dotato di schermo: **il computer portatile, computer fisso, tablet/Ipad, smartphone, televisione, console di gioco (Xbox, PlayStation, PSP, Nintendo, Nintendo Switch, Gameboy, ecc.), e-book/e-reader.**

    Durante la settimana: circa _____ore al giorno (**O** circa _____ minuti al giorno)*

    Nel fine settimana: circa _____ore al giorno (**O** circa _____ minuti al giorno)*

    *Se non trascorri del tempo davanti a uno schermo ogni giorno, indica per favore una frazione il più accuratamente possibile. Ad esempio 1/2 ora per 3 giorni (totale = 90min) durante la settimana, deve essere indicato come circa 1/3 ora al giorno (90 min/5 = 18 minuti = circa 1/3 ora).

IV. Sonno e salute

---

15. A che ora vai a dormire normalmente?   Durante la settimana: _____ (ora)
                                              Nel fine settimana: _____ (ora)

16. A che ora ti alzi normalmente?   Durante la settimana: _____ (ora)
                                              Nel fine settimana: _____ (ora)

17. Hai mai ricevuto una delle seguenti diagnosi (risultati d'esami) da un medico?

	Sì	No
Disabilità fisica	☐	☐
Asma	☐	☐
Diabete (di tipo 1 o di tipo 2)	☐	☐
Febbre da fieno (allergia ai pollini stagionali)	☐	☐
Disturbi da deficit di attenzione con o senza iperattività (ADHD)	☐	☐
Miopia (difficoltà a vedere lontano)	☐	☐
Celiachia	☐	☐
Disturbi del comportamento alimentare (anoressia, bulimia, disturbo da alimentazione incontrollata)	☐	☐

18. Come descriveresti il tuo stato di salute?
    ☐ eccellente

    ☐ buono

    ☐ abbastanza buono

    ☐ non buono

19. Le domande seguenti riguardano il tuo benessere nelle scorse due settimane. Per ogni affermazione, seleziona quella che meglio descrive come ti sei sentito nelle scorse due settimane.

Nelle scorse due settimane…	Tutto il tempo	Per la maggior parte del tempo	Per poco più della metà	Per poco meno della metà	Ogni tanto	Mai
Ero felice e di buon umore	☐	☐	☐	☐	☐	☐
Mi sono sentito calmo/a e rilassato/a	☐	☐	☐	☐	☐	☐
Mi sono sentito/a pieno/a di energia e attivo/a	☐	☐	☐	☐	☐	☐
Mi sono sentito/a fresco/a e riposato/a al risveglio	☐	☐	☐	☐	☐	☐
La mia quotidianità era piena di cose che mi interessavano	☐	☐	☐	☐	☐	☐

20. Pensi che:

    ☐ sei davvero troppo magro?

    ☐ sei un po' troppo magro?

    ☐ hai più o meno il peso giusto?

    ☐ sei un po' troppo grasso?

    ☐ sei davvero troppo grasso?

21. Su una scala da 0 a 10 dove ti collocheresti se dovessi pensare alla tua vita attuale?

    Il gradino più alto '10' significa: è la miglior vita che si possa avere.
    Il gradino più basso '0' significa: è la peggior vita che si possa avere.

    ☐ 10
    ☐ 9
    ☐ 8
    ☐ 7
    ☐ 6
    ☐ 5
    ☐ 4
    ☐ 3
    ☐ 2
    ☐ 1
    ☐ 0
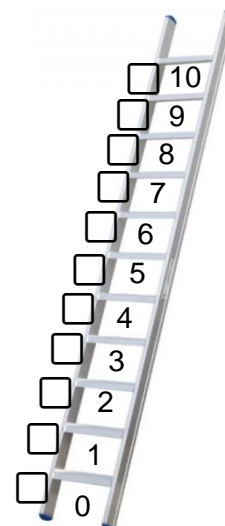
V. Covid-19

Per favore ripensa al periodo della pandemia di coronavirus.

22. Sei mai risultato positivo al test del Covid-19?
    (un risultato positivo del test significa che hai avuto il Covid-19).   ☐ Sì   ☐ No

23. Sei vaccinato contro il Covid-19?   ☐ Sì   ☐ No

24. La pandemia di coronavirus ha influenzato la tua salute (a causa della malattia di Covid-19, della vaccinazione, o della situazione pandemica stessa)?

☐ Sì   ☐ No

Se sì: selezionare tutto ciò che si applica

☐ Influenza a livello fisico

☐ Influenza a livello mentale/psicologico

☐ Influenza sull'alimentazione, sull'attività fisica, sul consumo dei media

☐ Altra influenza

VI. Domande generali

25. Da quanto tempo vivi in Svizzera?

☐ Da sempre   ☐ Da > 5 anni   ☐ da 1-5 anni   ☐ da < 1 anno

26. In quale paese sei nato?

☐ In Svizzera

☐ In un altro paese, ovvero: _____

27. In quale paese sono nati i tuoi genitori?

MADRE: PADRE:

☐ In Svizzera   ☐ In Svizzera

☐ In un altro paese, ovvero: ☐ In un altro paese, ovvero:

_____   _____

28. Qual è il diploma professionale/scolastico più alto che è stato conseguito dai tuoi genitori?
Per favore compila per entrambi!

MADRE: PADRE:

☐ scuola dell'obbligo   ☐ scuola dell'obbligo

☐ apprendistato   ☐ apprendistato

☐ apprendistato con maturità   ☐ apprendistato con maturità

☐ Scuola professionale (Supsi)   ☐ scuola professionale (Supsi)

☐ università/politecnico   ☐ università/politecnico

☐ altro _____ ☐ altro_____

29. I tuoi genitori lavorano attualmente? *Per favore compila per entrambi!*

MADRE: PADRE:

☐ Sì _____%   ☐ No   ☐ Sì _____%   ☐ No

30. Chi ha riempito il questionario?   ☐ bambino/a   ☐ Genitori   ☐ entrambi insieme

Grazie mille per la tua partecipazione!

Numéro de participant(e): _____

Etude Nationale de Santé et Nutrition des Enfants d'Ecole Primaire 2023

Questionnaire

Date de saisie: |__|__|.|__|__|.|__|__|__|__|

1. Année de naissance: |__|__|__|__|

2. Sexe: ☐ Garçon   ☐ Fille

I. Activité physique/sportive

3. À quel point t'amuses-tu en faisant de l'activité physique (comme courir, jouer avec un ballon, sauter partout)?

Je ne m'amuse pas du tout	Je m'amuse un peu	Je m'amuse beaucoup	Aucune de ces réponses
☐	☐	☐	☐

4. Ces derniers 7 jours, combien de jours as-tu été <u>physiquement actif/active</u>* pendant au moins 60 minutes? **Additionne tout le temps que tu passes à faire de l'activité physique chacun de ces jours**, le temps d'activité physique à l'école n'est pas inclu.

0 jours	1	2	3	4	5	6	7 jours
☐	☐	☐	☐	☐	☐	☐	☐

* Il s'agit ici de toutes les activités durant lesquelles le **coeur bat plus vite**, la **respiration est plus rapide** pendant un certain temps et on **transpire un peu**. Par exemple le sport, la course à pied, jouer à chat perché, une randonnée éprouvante, faire du patin à roulettes, faire du vélo, la danse, la natation, jouer au football, etc.

5. Combien de fois par semaine joues-tu habituellement en plein air (p.ex. jouer à chat perché, le jeu de l'élastique, aller à la piscine, …)?

Quotidiennement	6x	5x	4x	3x	2x	1x	Jamais
☐	☐	☐	☐	☐	☐	☐	☐

6. En moyenne, combien de temps joues-tu en plein air chacun de ces jours?
   Environ _____ minutes par jour

7. Pratiques-tu une discipline sportive? (dans un club sportif ou en privé, mais régulièrement)

Oui	Non
☐	☐

Si oui:

Quelle(s) discipline(s) sportive(s) pratiques-tu?	Combien de fois par semaine pratiques-tu cette discipline sportive?	Combien de temps dure l'entraînement (sans le trajet, te changer, te doucher)?
1._____ (discipline sportive)	____ fois par semaine	____ min par entraînement
2._____ (discipline sportive)	____ fois par semaine	____ min par entraînement
3._____ (discipline sportive)	____ fois par semaine	____ min par entraînement

8. Tes parents font-ils du sport avec toi?

Jamais	Rarement	Souvent	Toujours
☐	☐	☐	☐

9. Indique s'il-te-plaît, si et pendant combien de temps tu as fait du sport ou as bougé pendant la **dernière journée entière d'école**. As-tu …

	Non	Oui					
		1-15 min	16-30 min	31-60 min	1-2 h	2-3 h	plus que 3 h
bougé sur le chemin de l'école (à pied, à velo, en skateboard ou en trottinette)?	☐	☐	☐	☐	☐	☐	☐
bougé durant le sport scolaire obligatoire ou facultatif?	☐	☐	☐	☐	☐	☐	☐
bougé pendant les cours (p.ex. pauses actives durant lesquelles on bouge ensemble)?	☐	☐	☐	☐	☐	☐	☐
bougé pendant les récréations?	☐	☐	☐	☐	☐	☐	☐
bougé durant le sport en dehors de l'école (p.ex. fait du sport dans un club sportif ou joué avec des amis)?	☐	☐	☐	☐	☐	☐	☐
bougé durant d'autres activités (p.ex. aider à faire le ménage, jardiner)?	☐	☐	☐	☐	☐	☐	☐

II. Comportement alimentaire

10. Prends-tu habituellement un petit-déjeuner (plus qu'un verre de lait ou de jus de fruits)?

En semaine	☐ Oui	☐ Non
Le week-end	☐ Oui	☐ Non

11. Combien de fois as-tu bu ou mangé les produits suivants au cours des quatre dernières semaines? **S'il te plaît coche à chaque fois une seule réponse par ligne!**

	Rarement - jamais	1-3x / mois	1x / se-maine	2-4x / se-maine	5-6x / se-maine	1x / jour	2x / jour	3x / jour	4x / jour	5x / jour
Boissons sucrées avec du sucre (p.ex. Coca, thé glacé, Capri Sun, etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Boissons sucrées artificiellement (p.ex. light et zéro)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Jus de fruits ou de légumes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fruits	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Légumes, y compris la salade	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lait et produits laitiers (fromage, yogourts, etc.)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Viande, charcuterie, poisson	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. Combien de fois manges-tu habituellement avec ta famille?

☐ chaque jour
☐ plusieurs fois par semaine
☐ environ une fois par semaine
☐ moins souvent
☐ jamais

13. Lesquels des produits suivants manges-tu le plus souvent pour le dix-heures et pour le goûter?
Coche à chaque fois au maximum 3 produits.

	Dix-heures	Goûter
Je ne mange pas de	☐	☐
Pain, Blevita, Darvida, galettes de maïs/riz	☐	☐
Fruits ou légumes frais	☐	☐
Fromage	☐	☐
Charcuterie (Minipic, saucisse de Lyon, salami, jambon)	☐	☐
Noix	☐	☐
Fruits secs	☐	☐
Barres de céréales (Farmer etc.)	☐	☐
Yogourts ou lait/boissons à base de lait	☐	☐
Biscuits sucrés, croissants aux noisettes, gâteaux, etc.	☐	☐
Sucreries (bonbons, chocolat)	☐	☐
Chips, Tuc	☐	☐
Autre, à savoir: _____	☐	☐

III. Consommation de médias

14. Combien de temps passes-tu en moyenne **par jour** dans ton temps libre devant un écran?
    Pense ici à tous les appareils avec un écran: **ordinateur portable, ordinateur fixe, tablette/iPad, smartphone, télévision, console de jeux (Xbox, Play Station, PSP, Nintendo, Nintendo Switch, Gameboy…), e-book/e-reader).**

    En semaine: environ _____ heures/jour (**OU** environ _____minutes/jour)*

    Le week-end: environ _____ heures/jour (**OU** environ _____minutes/jour)*

    *Si tu ne passes pas du temps devant un écran chaque jour, indique s'il te plaît une fraction autant précise que possible. Par exemple 1/2 heure pendant 3 jours (= total de 90 min) en semaine est à indiquer comme environ 1/3 heure par jour (90min/5 = 18 min = environ 1/3 heure).

IV. Sommeil et Santé

15. À quelle heure te couches-tu habituellement ?　　　　En semaine: _____ (heure)
    　　　　　　　　　　　　　　　　　　　　　　　　　Le week-end: _____ (heure)

16. Quand te lèves-tu habituellement ?　　　　　　　　　En semaine: _____ (heure)
    　　　　　　　　　　　　　　　　　　　　　　　　　Le week-end: _____ (heure)

17. As-tu déjà reçu un des diagnostics suivants (résultats d'examens diagnostiques) de la part d'un(e) médecin?

	Oui	Non
Handicap physique	☐	☐
Asthme	☐	☐
Diabète (de type 1 ou de type 2)	☐	☐
Rhume des fois	☐	☐
Trouble du déficit de l'attention avec ou sans hyperactivité (TDAH, TDA)	☐	☐
Myopie (je vois mal au loin)	☐	☐
Maladie coeliaque	☐	☐
Troubles alimentaires (anorexie, boulimie, hyperphagie boulimique)	☐	☐

18. Comment décrirais-tu ton état de santé?

    ☐ Excellent

    ☐ Bon

    ☐ Relativement bon

    ☐ Mauvais

19. Les questions suivantes concernent ton bien-être au cours des deux dernières semaines. S'il te plaît coche, pour chaque affirmation, ce qui décrit le mieux comment tu t'es senti(e) au cours des deux dernières semaines.

Au cours des deux dernières semaines …	Tout le temps	La plupart du temps	Un peu plus que la moitié	Un peu moins que la moitié	De temps en temps	Jamais
j'étais joyeux/joyeuse et de bonne humeur	☐	☐	☐	☐	☐	☐
je me suis senti(e) calme et détendu(e)	☐	☐	☐	☐	☐	☐
je me suis senti(e) plein(e) d'énergie et actif/active	☐	☐	☐	☐	☐	☐
je me suis senti frais/fraîche et reposé(e) au réveil	☐	☐	☐	☐	☐	☐
mon quotidien était plein de choses qui m'intéressent	☐	☐	☐	☐	☐	☐

20. Penses-tu que:

☐ tu es beaucoup trop maigre ?

☐ tu es un peu trop maigre?

☐ tu as plus ou moins le bon poids?

☐ tu es un peu trop gros(se)?

☐ tu es beaucoup trop gros(se)?

21. Où te situerais-tu sur cette échelle, si tu considères ta vie actuelle?

L'échelon le plus haut '10' signifie: La meilleure vie que tu puisses imaginer
L'échelon le plus bas '0' signifie: La pire vie que tu puisses imaginer

☐ 10
☐ 9
☐ 8
☐ 7
☐ 6
☐ 5
☐ 4
☐ 3
☐ 2
☐ 1
☐ 0
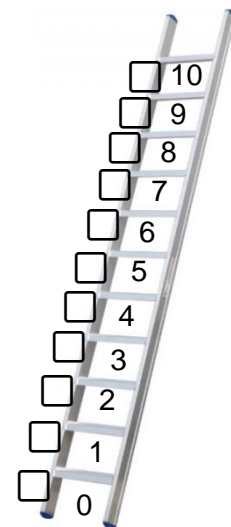
V. Covid-19

Repense s'il te plaît à la période pendant la pandémie de coronavirus…

22. As-tu déjà une fois été testé(e) positif/positive au Covid-19?
(un résultat de test positif signifie que tu as eu le Covid-19)   ☐ oui   ☐ non

23. Es-tu vacciné(e) contre le Covid-19? ☐ oui   ☐ non

24. Est-ce que la pandémie de coronavirus (que ce soit à travers la maladie Covid-19, la vaccination ou la situation elle-même durant la pandémie) a eu une influence sur ta santé?

    ☐ Oui   ☐ Non

    Si oui: coche s'il te plaît tout ce qui s'applique

        ☐ impact physique

        ☐ impact mental/psychologique

        ☐ impact sur l'alimentation, l'activité physique, la consommation de médias

        ☐ autre impact

VI. Questions générales

25. Depuis combien de temps vis-tu déjà en Suisse?

    ☐ Depuis toujours   ☐ depuis >5 ans   ☐ 1-5 ans   ☐ depuis <1 an

26. Dans quel pays es-tu né(e)?

    ☐ En Suisse

    ☐ Dans un autre pays, à savoir: _____

27. Dans quel pays tes parents sont-ils nés?

MÈRE   PÈRE

☐ En Suisse   ☐ En Suisse

☐ Dans un autre pays, à savoir: ☐ Dans un autre pays, à savoir:

    _____   _____

28. Quel est le plus haut diplôme professionnel/scolaire obtenu par tes parents?
Remplis s'il te plaît pour les deux!

MÈRE: PÈRE:

☐ Scolarité obligatoire   ☐ Scolarité obligatoire

☐ Apprentissage   ☐ Apprentissage

☐ Apprentissage avec maturité professionnelle ☐ Apprentissage avec maturité professionnelle

☐ Haute école spécialisée   ☐ Haute école spécialisée

☐ Université   ☐ Université

☐ Autre _____   ☐ Autre _____

29. Tes parents ont-ils un emploi/travaillent-ils actuellement? **Remplis s'il te plaît pour les deux!**

    MÈRE: PÈRE:

    ☐ Oui _____%   ☐ Non   ☐ Oui _____%   ☐ Non

30. Qui a rempli le questionnaire?   ☐ enfant   ☐ parents   ☐ les deux ensemble

Merci beaucoup pour ta participation!