

## KiGGS – The German Health Interview and Examination Survey for Children and Adolescents Abstracts Principal Publication

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 533-546

B.-M. Kurth

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): an overview of its planning, implementation and results taking into account aspects of quality management**

**Abstract** The aim of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) was to improve the information available on the health of the upand- coming generation in Germany and to fill gaps in knowledge. This was to be done using a nationwide representative investigation and survey of children and adolescents aged 0 to 17. From May 2003 to May 2006, 17,641 girls and boys took part in the study at 167 locations in Germany; along with their parents' input they provided a unique pool of information. From the point of view of quality management, there is a description of the planning, structures, efficient use of funding, implementation and planned evaluation of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). In this description, the quality achieved is evaluated by comparing what was actually achieved with the targets set. In this manner, a comprehensive overview can be provided of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS): what it concerns, its modular structure, the co-operation partners involved, institutions financing it, regulatory processes accompanying it and strategies for evaluation. At the same time, it is shown how the individual publications in the journal for public health, health research and health protection (Bundesgesundheitsblatt) special issue no. 5/6 2007 connect to one another and to the issue as a whole.

**Keywords** Health survey - Children - Adolescents - Examination - Interview - Modules - Quality management

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 547-556

P. Kamtsiuris · M. Lange · A. Schaffrath Rosario

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): Sample design, response and nonresponse analysis**

**Abstract** From May 2003 to May 2006, the Robert Koch Institute conducted the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Aim of this nationwide interview and examination survey was to collect, for the first time, comprehensive and nationwide data on the health status of children and adolescents aged 0 to 17 years. Subject recruitment was carried out in two steps: first, 167 study locations (sample points) were chosen; second, subjects were selected from the official registers of residents of the local residents' registration offices. The percentage of quality-neutral drop-outs was comparatively low (5.3%). The participation rate was 66.6% and showed only little variation between age groups and sexes, but marked variation between resident aliens and Germans, between inhabitants of cities with a population of 100,000 or more and sample points with fewer inhabitants, as well as between the old West German states and the newly-formed German states (incl. Berlin). A total of 17,641 children and adolescents were surveyed, of whom 8,985 were boys and 8,656 were girls. The completeness of the data sets in relation to the modules was good. The main reasons for non-participation were failure to appear at an agreed appointment time (or cancellation of the appointment at short notice), the refusal of the child/adolescent himself, or lack of interest of the parents.

**Keywords** Health Survey - Children - Adolescents - Sample - Response - Non-response

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 557-566

H. Hölling · P. Kamtsiuris · M. Lange · W. Thierfelder · M. Thamm · R. Schlack

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): Study management and conduct of fieldwork**

**Abstract** From May 2003 to May 2006, the Robert Koch Institute conducted the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Nationwide data collection in 167 cities and municipalities was carried out by 4 survey teams, each consisting of a physician, centre interviewer, examiner, medical laboratory technician, environmental interviewer. Regional and seasonal factors were excluded by systematised route planning. Invitation of the participants and appointments for examinations were handled by a survey office with subsidised service telephone. Data processing in the survey office was performed using an SQL data base system programmed in the RKI. One central and several regional members of staff performing preparatory field visits were responsible for finding suitable examination rooms and for subject recruitment respectively. To further increase the response rate, continuous public relation actions were established. The survey involved questionnaires filled in by parents and parallel questionnaires for children from the age of 11 years onwards, physical examinations and tests and a computer assisted personal interview performed by the physician. The wide range of blood and urine testing carried out at central laboratories required standardised transport logistics. To achieve a high degree of standardisation of the survey, the examination teams were initially trained and then underwent continuous further training. The concept of quality management covered action of internal and independent external quality control monitoring each data collecting and data processing step as well as the training courses. Conclusion: Dedicated public relations activities and the deployment of staff performing preparatory field visits increased the willingness of the subjects to participate. Intensive personnel care and continuous quality checks contribute to increased job satisfaction and data quality. By bindingly defining all laboratory diagnostic processes as well as transport logistics, high-quality laboratory test results are ensured. The conduct of the study from design via conduct to data processing and analysis by one institution guarantees complete control of all steps of the survey.

**Keywords** Health survey - Children - Adolescents - Study logistics - Field work - Route planning - Subject recruitment - Quality assurance - Staff training

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 567-572

R. Dölle · A. Schaffrath Rosario · H. Stolzenberg

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): Data management**

**Abstract** In the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), comprehensive, nationwide representative data on the state of health of children and adolescents were collected for the first time. During the 3-year data collection phase of the survey, 17,641 subjects were examined and interviewed and approx. 1,500 items were recorded. Data management was not limited to survey data collection, administration and quality assurance alone, but also comprised the provision of tools for the management and control of process data, as well as for managing survey-specific business processes. In the context of the KiGGS study, numerous components for supporting the extensive and complex processes were developed for the study staff. Here the primary focus was on subject and sample point administration, scheduling, sampling, reporting, field logistics and laboratory data management. Thanks to the computer-based processing of routine tasks involved in the organisation of the field work, ease of work and project progress control were enhanced significantly. To some extent, KiGGS-specific components have already been used in

other studies and only minor adaptations were needed for the transfer. The main emphasis with regards to survey data management was on the standardisation of methods for data processing, data control and data cleaning. Here, a wealth of previous experiences was available as a starting point. The established quality assurance methods were standardised to a large extent and partly automated and complemented by data base tools for the management and documentation of survey instruments and quality assurance measures. All these measures combined made it possible to provide data users with a controlled and cleaned final data set, including a detailed documentation.

**Keywords** Health survey - Children - Adolescents - Data management - Data quality assurance - Data collection - Workflow organisation

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 573-577

B. Filipiak-Pittroff · G. Wölke

### **External quality assurance in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Procedure and results**

**Abstract** The results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) of the Robert Koch Institute (RKI) will be of great importance for health policy and research. Therefore, in this study internal quality assurance was supplemented by an external quality assurance which was carried out by the institute of epidemiology at the GSF National Research Center for Environment and Health. The subjects were the interviewer training, sampling and response, field work and data management. External quality assurance was defined as ‘an audit of internal quality assurance measures and systematic observation and spot checks to ensure quality requirements were fulfilled’. The requirements followed the manual of operation and the recognized epidemiologic standards and guidelines. For the different subjects, tests and detailed check-lists were developed and used. The quality requirements were fulfilled: The field work was performed with high quality and remarkable engagement over the whole time from May 2003 to May 2006, which resulted in high response and data quality. An extensive, efficient quality management system was in place for the data management.

**Keywords** Health Survey - Children - Adolescents - Epidemiology - Field work - Response - Data management - Quality management

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 578-589

M. Lange · P. Kamtsiuris · C. Lange · A. Schaffrath Rosario · H. Stolzenberg

### **Sociodemographic characteristics in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) – operationalisation and public health significance, taking as an example the assessment of general state of health**

**Abstract** The German Health Interview and Examination Survey for Children and Adolescents (KiGGS) was conducted from May 2003 to May 2006 by the Robert Koch Institute in 167 communities representative of Germany. By collecting comprehensive and nationally representative data on the health status of children and adolescents aged 0 to 17 years, the study aimed to fill a longstanding evidence gap. Data from 17,641 study participants will be analysed in a timely and systematic manner by the Robert Koch Institute. Initially mainly descriptive analyses as presented in the current special issue on the KiGGS study, provide information on the distribution of main health characteristics according to sociodemographic key variables, including age, sex, region of residence (former East/West Germany), social status, and migrant background. We report here the rationale for a standard set of stratifying variables and the operationalisation of composite variables. Furthermore, we illustrate the public health relevance of the observed group differences using the example of an important health indicator: parents' evaluation of their children's general state of health.

**Keywords** Health survey - Children - Adolescents - Gender - Germany - Reunification - Social status - Migration - Subjective general state of health

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 590-599

L. Schenk · U. Ellert · H. Neuhauser

### **Children and adolescents in Germany with a migration background. Methodical aspects in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** A migration-specific approach was used in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) and thus it was possible for the first time to include children with a migration background in a nationwide health survey in Germany in a number corresponding to their percentage of the population. This article presents the migration-specific approach used in KiGGS as well as a definition of the term „migrant“ and its operationalisation. In addition, we analyse the representativity of the migrant subsample and present data on its composition. Altogether 2,590 children and adolescents with a migration background (both parents) took part in the study; in the weighted sample they account for 17.1% of all children and adolescents. Another 8.3% of the children and adolescents have one parent with a migration background. The two largest groups among the migrant children are Germans from Russia (29.9%) and children and adolescents of Turkish origin (28.2%). There are differences between migrants and non-migrants related to socio-economic status and place of living (rural/urban and East/West). Analyses of the representativity of the migrant sample show that children and adolescents with a lower level of education are under-represented, whereas there were no differences with regard to sex, the fathers' occupation or the mothers' smoking status. Non-respondents rate their children's health better than respondents. Since the successful integration of children and adolescents with a migration background into the KiGGS study brings with it a sufficiently large number of cases and since KiGGS covers a wide range of health-related topics, comprehensive migration-specific analyses can be performed. Thus, KiGGS will contribute to filling some of the current gaps in our knowledge of migrant children's health.

**Keywords** Health survey - Children - Adolescents - Migration

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 600-608

T. Lampert · M. Thamm

### **Consumption of tobacco, alcohol and drugs among adolescents in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Due to its long-lasting effects, the consumption of tobacco, alcohol and drugs is one of the central topics of prevention and health promotion in childhood and adolescence. The data from the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) show that in Germany today 20.5 % of 11–17-year-old boys and 20.3 % of girls the same age smoke. More than one quarter of adolescents who do not smoke themselves are exposed to cigarette smoke several times a week; around one fifth are even exposed to it almost every day. In the case of alcohol, 64.8 % of boys and 63.8 % of girls have drunk it before. Around one third of boys and one quarter of girls indicated that they currently consumed alcohol at least once a week. In the last 12 months before the survey 9.2 % of the boys and 6.2 % of the girls had taken hashish or marijuana. Other drugs such as Ecstasy, amphetamines or speed had been consumed by less than 1 % of the adolescents. The use of psychoactive substances rises markedly as children get older and is thus the most widespread among 16–17-year-olds. Adolescents of low social status smoke more frequently; in the case of alcohol and drug consumption, however, no significant status-specific differences are observed. There is also a raised prevalence of smoking among boys and girls who attend a secondary school and live in the states of the former GDR. The results emphasise the need for an addiction prevention programme which should include intervention to prevent children taking up substance use, as well as withdrawal treatment.

**Keywords** Health survey - Children - Adolescents - Tobacco - Smoking - Alcohol - Drugs - Substance use

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 609-623

G. B. M. Mensink · C. Kleiser · A. Richter

### **Food consumption of children and adolescents in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Since dietary behaviour has an essential impact on health, information on food consumption was obtained in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). The average food frequency and portion size “in recent weeks” was assessed with a food frequency questionnaire. Two versions of the questionnaire, identical in content, exist: one aimed at parents of 1–10-year-olds and the other directly at 11–17-year-olds. The results include data on 7,186 boys and 6,919 girls, aged 3–17. About half of the participants each consume bread, milk and fresh fruits every day. The majority (about three quarter) eat fast food only once a month or less. However, 16 % of the participants eat chocolate, and almost 20 % other sweets every day. More boys than girls individually consume soft drinks, milk, dairy products, meat, sausage, cereals and white bread every day. More girls consume fresh fruits and raw vegetables each day. With increasing age the proportion of daily consumers of soft drinks, cheese (and among boys also meat and sausage) increases, but the proportion of daily consumers of juices, tap water, milk, dairy products, fresh fruits, raw vegetables, cookies, chocolate, sweets (and among girls also breakfast cereals) falls. As expected the consumption of sweets and soft drinks is relatively high. Whereas more than half of the children each consume fruits and vegetables on a daily base, this consumption declines with increasing age.

**Keywords** Health survey - Children - Adolescents - Nutritional epidemiology - Dietary assessment methods

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 624-633

C. Lange · L. Schenk · R. Bergmann

### **Distribution, duration and temporal trend of breastfeeding in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Breast milk is the most natural and best type of nutrition for almost all infants. Moreover, breastfeeding is associated with health benefits for mother and child: breast milk supports the development of the infant and protects it against diseases; the health benefits for the mothers also extend beyond the period after birth. Therefore, the WHO recommends exclusive breastfeeding for at least six months. Until now, no representative data on the breastfeeding rate have been available in Germany. The KiGGS results show an increase in the breastfeeding rate from 1986 to 2005. Across all age groups studied, 76.7 % (95 % CI: 75.2 %–78.1 %) of the children were ever breastfed. The rate of ever-breastfed children was significantly lower in mothers from socially disadvantaged population groups, children of mothers who had smoked during pregnancy or in situations with problems after birth. Children with migration background were more frequently ever-breastfed than children without migration background. The average duration of breastfeeding was – across all age-groups – 6.9 months (95 % CI: 6.8–7.0); the duration of full breastfeeding was 4.6 months (95 % CI: 4.5–4.7) on average. 22.4 % (95 % CI: 21.4 %–23.5 %) of all children from the KiGGS study population were exclusively breastfed for a period of six months. The results emphasises the necessity to further promote breastfeeding, especially to support the socially disadvantaged, and most of all to encourage a positive attitude towards breastfeeding in the society.

**Keywords** Health survey - Children - Adolescents - Duration of breastfeeding - Breastfeeding rate - Full breastfeeding - Social disadvantage - Promotion of breastfeeding

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 634-642

T. Lampert · G. B. M. Mensink · N. Romahn · A. Woll

### **Physical activity among children and adolescents in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Regular physical activity has a positive effect on health and wellbeing at any age. For this reason, sports and exercise enhancing measures are inherent parts of public health in Germany. The German Health Interview and Examination Survey for Children and Adolescents (KiGGS) provides a nationally representative database which allows a comprehensive analysis of physical activity behaviour among young people. This may support the planning and implementation of health intervention measures. Primary results of KiGGS indicate that most children aged 3 to 10 years regularly go in for sports: around three quarters of girls and boys go in for sports at least once a week, and even more than one third three times a week or more. Children without sport engagement come disproportionately often from families with low socioeconomic status, with a migration background or from former East Germany. Also among adolescents sports and exercise activity is very common. Among 11–17 year olds, however, the current recommendation to conduct physical and or sports activities on most days of the week is only achieved by every fourth boy and every sixth girl. Especially girls with low socioeconomic status and with a migration background show a lack of physical activity. These results underline the importance of sports- and exercise-promoting measures in childhood and adolescence, designed for specific target groups.

**Keywords** Health survey - Children - Adolescents - Sport - Exercise - Physical activity

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 643-652

T. Lampert · R. Sygusch · R. Schlack

### **Use of electronic media in adolescence. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** The use of electronic media is playing an ever greater role in adolescents' recreational behaviour. From the point of view of the health sciences, one question which arises is the extent to which intensive media use is detrimental to physical activity and adolescents' health development. The data from the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), which were evaluated with a focus on 11–17-year-olds, confirm this heavy use of electronic media. However, there are distinct group-specific differences. For example, boys spend more time than girls on computers, the internet and games consoles, whereas girls more often listen to music and use their mobile phones. Watching television and videos is equally popular among girls and boys. Adolescents of low social status or a low level of school education use electronic media far more frequently and for longer times, especially television and video, games consoles and mobile phones. The same is true of boys and girls from the former states of the GDR and for boys (but not girls) with a background of migration. A connection to physical activity has been established for adolescents who spend more than five hours a day using electronic media. Moreover, this group of heavy users is more often affected by adiposity. The results of the KiGGS study, which are in line with earlier research findings, thus demonstrate that the use of electronic media is also of relevance from the point of view of public health and should be included in investigations into the health of children and adolescents.

**Keywords** Health survey - Children - Adolescents - Electronic media - Television - Computer - Internet - Video games

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 653-658

L. Schenk · H. Knopf

### **Oral health behaviour of children and adolescents in Germany. First results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Despite successful prevention and the possibility to directly control oral health by individual behaviour, children are still affected by caries. Aim of this article is to determine the prevalence and the social factors influencing selected aspects of oral health behaviour based on data of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Over a period of three years, 17,641 children and adolescents aged 0 to 17 years – a representative sample for Germany – were examined in the nationwide KiGGS study. Based on a written survey and a medical interview, data on oral health behaviour were also collected. 29 % of the surveyed children and adolescents brushed their teeth only once daily or less frequently. This type of teeth brushing behaviour shows a social status gradient (low: 39 %, middle: 28 %, high: 22 %) and is more frequently found in children with a migration background (45 %) than in those without a migration background (26 %). Differences were also found between girls and boys (girls: 25 %; boys: 33 %). In only 8 % of cases, parents stated that their children have a dental check-up less than once a year. However, this information substantially differs from the actual visits to dentists. Here again, differences regarding social status (low: 12 %; high: 6 %) and migration status (migrants: 16 %; nonmigrants: 6 %) were found. According to the parents, 43 % of the 0-to-2-year-olds and 7 % of the 3-to-6-year-olds use pharmaceutical preparations for caries prevention. Relevant differences were found between migrants (5 %) and non-migrants (8 %). These results show that there is primarily a need for social status-specific and culture-specific prevention. To identify starting points for effectively offering preventative measures, a systematic study into the factors causing these behavioural differences is needed.

**Keywords** Health survey - Children - Adolescents - Teeth brushing frequency - Dental check-up - Caries prevention

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 659-669

H. Stolzenberg · H. Kahl · K. E. Bergmann

### **Body measurements of children and adolescents in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In the nationwide German Health Interview and Examination Survey for Children and Adolescents (KiGGS), a number of anthropometric parameters were assessed in a standardised way in 17,641 boys and girls. To this end, body weight and height, head circumference and upper arm length, as well as two skinfold thicknesses (triceps, subscapular) were measured for the entire age range (0–12 years); starting from 6 years of age, elbow breadth and from 11 years of age waist and hip circumference were measured in addition. For all parameters, means with confidence intervals are reported per age (in years) and gender. Median graphs depict the changes with increasing age according to gender for each body measurement. The complex age-related anthropometric developments along with significant gender specificity show the full range of the dynamic physical development in boys and girls. Based on skinfold measurement data, the body fat percentage was estimated. Thickness and location of the skinfolds, as well as the calculated waist-to-hip ratio is used as an indicator for gender-specific fat distribution. Using the frame index, it is attempted to estimate skeletal robustness. For the anthropometric parameters studied, hardly any regional differences were found. However, head circumference, frame index and all parameters strongly associated with body fat show a significant social status gradient. Children and adolescents with migration background have on average a lower height, larger waist circumference and higher percentage of body fat.

**Keywords** Health survey - Children - Adolescents - Anthropometry - Body measurements

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 670-676

K. E. Bergmann · R. L. Bergmann · U. Ellert · J. W. Dudenhausen

### **Perinatal risk factors for long-term health. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** KiGGS is a health survey on 17,641 children and adolescents in 167 communities representative for Germany, conducted between May 2003 and May 2006. Of the perinatal indicators, only a small proportion of data important for long-term outcomes was available for statistical analysis, and is presented here. In the past 20 years the mean weight gain during pregnancy has increased significantly by 2 kg, the mean birth weight has increased significantly by an average of 50 g, there has been no significant time trend for smoking and alcohol consumption in pregnancy. Birth weight and pregnancy weight gain of the mother correlate significantly. Pregnancy weight gain explains 5% of the birth weight in first-born infants. 17–18% of the mothers smoked during pregnancy, 4 times as many in the lower than the upper social class. 14% of the mothers consumed alcohol in pregnancy, but only 1% regularly. Only 5% of the migrants, but 3 times as many of the non-migrants consumed alcohol in pregnancy, and 2 1/2 times as many of the upper class compared to the lower class. With respect to smoking and alcohol consumption during pregnancy there seems to be an urgent need for political action.

**Keywords** Health Survey - Children - Adolescents - Pregnancy - Birth weight - Smoking - Alcohol - Weight gain

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 677-685

H. Kahl · A. Schaffrath Rosario · M. Schlaud

### **Sexual maturation of children and adolescents in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Following the standstill in maturity acceleration in the eighties of the twentieth century, now a further shift in maturity development towards younger ages is the issue of an international and also German discussion. The collection of sexual maturity data in boys and girls as part of the nationwide German Health Interview and Examination Survey for Children and Adolescents (KiGGS) is intended to provide population-representative information on sexual maturation and to evaluate associations between maturity status and selected health and social data. Girls were interviewed regarding their first menstrual period (menarche) and boys regarding voice change (status-quo method). Pubic hair was self-assessed by children and adolescents from 10 to 17 years of age, based on drawings of Tanner's defined developmental stages. The median age for menarche, for voice change and pubic hair stages were calculated using a logit model. At an age of 10 years, 42.4 % of girls and 35.7 % of boys report the development of pubic hair. At 17 years of age, the majority of girls and boys have reached the stages PH5 (girls 57.5 %, boys 47.8 %) and PH6 (girls 23.6 %, boys 46.5 %) according to Tanner. The average age for each pubic hair stage is lower in girls (PH2 10.8; PH3 11.7; PH4 12.3; PH5 13.4 years) than in boys (PH2 10.9; PH3 12.6; PH4 13.4; PH5 14.1). The median age at menarche is 12.8 years, the median for voice change (voice low) 15.1 years. Significant differences in age at menarche are found in girls depending on socioeconomic status (12.7/12.9/13.0 years for low/middle/high status) and between girls with and without migration background (12.5/12.9 years). No differences in age at menarche can be seen between East and West Germany or cities and rural areas. The association between maturity status and BMI is more pronounced in girls than in boys. Overall, the onset of maturity development in German children and adolescents is not significantly earlier than in other European studies.

**Keywords** Health survey - Children - Adolescents - Sexual maturity - Menarche - Mutation - Pubic hair

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 686-700

P. Kamtsiuris · K. Atzpodien · U. Ellert · R. Schlack · M. Schlaud

### **Prevalence of somatic diseases in German children and adolescents. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), which was conducted from 2003 to 2006, data on acute/infectious and chronic diseases were collected from a population-based sample of 17,641 subjects aged 0 to 17 years. The annual prevalence rates among acute diseases vary widely. Children and adolescents are most frequently affected by acute (infectious) respiratory conditions. 88.5 % of the surveyed children and adolescents experienced at least one episode of common cold within the last 12 months. Among the other acute respiratory infections, bronchitis and tonsillitis were the most frequently encountered conditions with 19.9 % and 18.5 %, respectively. The 12-month prevalence of otitis media and pseudocroup was 11 % and 6.6 %, respectively. 1.5 % of the children and adolescents experienced an episode of pneumonia. Apart from respiratory infections, gastrointestinal infections were very frequently stated as reasons for acute illness. Furthermore, 12.8 % of the children and adolescents experienced a herpetic infection, 7.8 % a conjunctivitis and 4.8 % a urinary tract infection. Lifetime prevalence rates of infectious diseases were as follows: pertussis 8.7 %, measles 7.4 %, mumps 4.0 %, rubella 8.5 %, varicella 70.6 %, scarlet fever 23.5 %. The various chronic somatic diseases in children and adolescents had different lifetime prevalence rates. Most frequently, children and adolescents were affected by obstructive bronchitis (13.3 %), neurodermatitis/atopic eczema (13.2 %) and hay fever (10.7 %). Scoliosis and asthma had been diagnosed by a doctor in 5.2 % and 4.7 % of subjects aged 0–17 years, respectively. The lifetime prevalence rates of the remaining diseases varied between 0.14 % for diabetes mellitus and 3.6 % for convulsions/epileptic fits. For the first time ever, these survey results provide nationwide representative information on the prevalence rates of acute/infectious and chronic diseases in children and adolescents which is based on a population-representative sample.

**Keywords** Health survey - Children - Adolescents - KiGGS - Somatic diseases

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 701-710

M. Schlaud · K. Atzpodien · W. Thierfelder

### **Allergic diseases. Results from the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) from 2003–2006 information was collected on allergic diseases (asthma, atopic dermatitis, hay fever, allergic contact eczema) from a population-based sample of 17,641 0–to 17-year-olds, and blood samples were studied for specific IgE antibodies to 20 common allergens. The lifetime prevalence (LTP) of at least one atopic disease was 22.9 % (95 % CI: 22.0–23.7 %), the 12-month prevalence (12MP) was 16.1 % (15.4–16.8 %); boys (17.3; 16.3–18.2 %) were more frequently affected than girls (14.9; 14.0–15.8 %). Children with a background of migration were less often currently affected by an atopic disease, as were children from families of low social status. According to parents' accounts, the LTP of allergic contact eczema was 9.9 % (9.4–10.5 %); girls (13.8; 12.9–14.8) were more frequently affected than boys (6.2; 5.6–6.9 %). Of the 3- to 17-year-olds, 40.8 % (39.6–42.0 %) were sensitised to at least one of the allergens tested; boys (45.0; 43.5–46.5 %) more frequently so than girls (36.4; 35.0–37.9 %). In the states of the former FRG, the LTP of allergic contact eczema was higher (10.2; 9.6–10.9 %) than those in the former GDR (8.4 % 7.4–9.6 %); otherwise there were no East-West differences. The KiGGS data provide the first nationally representative data on allergic diseases and sensitisation. The differences in prevalence observed correspond to a great extent with previous studies and may support the hygiene hypothesis. The prevalences in East and West Germany now seem to have equalised.

**Keywords** Health Survey - Children - Adolescents - Allergies - Atopies - Sensitisation - Asthma - Atopic dermatitis - Hay fever - Allergic contact eczema

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 711-717

U. Ellert · H. Neuhauser · A. Roth-Isigkeit

### **Pain in children and adolescents in Germany: the prevalence and usage of medical services. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** As part of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), representative data were collected on pain in 14,959 children and adolescents aged 3 to 17 years in Germany. The results are reported separately for 11–17-year olds, who were asked themselves, and 3–10 year olds, whose parents reported on their pain. Among the 3–10 year olds, the prevalence of pain over three months was 64.5% and among the 11–17 year olds it was 77.6% (71.1% altogether for the 3–17 year old children). Pain prevalence increased significantly with age; in all age groups girls reported pain significantly more often than boys of the same age. In the 3–10 year olds the most common pain localisation was stomach pains, followed by pain in the head and throat. Children and adolescents aged 11 to 17 most often reported headaches, followed by pains in the stomach and back. Pain occurring at least once a week in the last three months was reported by 24.3% of the 11–17 year old children and adolescents and by 9.9% of the 3–10 year old children suffering from pain. More than half (54.1%) of the 3–10 year olds and more than one third of the 11–17 year olds (35.9%) who reported recurrent principal pain consulted a doctor for this reason; 36.7% and 46.7% respectively took medicine. These results show that pain is a relevant problem in children and adolescents in Germany.

**Keywords** Health Survey - Children - Adolescents - Pain - Epidemiology - Use of medical services

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 718-727

H. Kahl · R. Dortschy · G. Ellsäßer

### **Injuries among children and adolescents (1–17 years) and implementation of safety measures. Results of the nationwide German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Parent interviews with regard to their children's accidents and to accident protective measures in the Health Interview and Examination Survey for Children and Adolescents (KiGGS) aimed at extending our knowledge of age- and gender-specific injuries and to identify risk groups and risk factors for injury prevention. The parents of 16,706 children (aged 1–17 years) were asked about their children's injuries within the last 12 months which were medically treated, and about accident mechanisms, consequences of injuries, and ambulatory and hospital treatment. In addition, parents and children aged 11 to 17 years (n = 6813) were asked to give information on protective measures. According to the parents 15.9 % of the children had at least one injury within the last 12 months, 15.2 % because of an accident and 0.8 % because of assault. In the age group 1–17 boys have been injured significantly more often than girls (17.9 % vs. 14.0 %). Overall, 13.3 % of 2,410 injured children and adolescents were hospitalized. Two thirds of the accidents among toddlers were domestic accidents (60 %) whereas leisure and sport accidents were most prevalent in children and adolescents aged 5–14 years and 15–17 years (32.1 % and 38.9 %). The proportion of accidents in child care facilities and educational institutions tripled from infancy to school age (age 5–14 years) (10.9–28.7 %), as did traffic accidents (5.6–16.7 %). The three most frequent injury mechanisms in the age range 1–17 years were falls on level ground (35.2 %), falls from heights (25.2 %) and collisions with objects or persons (20.6 %). Falls from heights showed the highest risk in toddlers (35.8 %). Contusions, sprains and strains increased to a highest level of 50.9 % in adolescents; likewise, bone fractures increased from 10.7 % in toddlers to 21.8 % in adolescents aged 15–17 years. An influence of socioeconomic status on injuries overall and on consequences of injuries was not seen. For traffic accidents in children aged 1–17 years boys (p = 0.019) and girls (p = 0.047) from families with lower socioeconomic status showed higher rates of accidents than children from families with higher socioeconomic status. The application of protective measures was lowest in the age group 14–17 years. While according to the parents about 90 % of children aged 3–4 years wear a helmet when riding a bicycle or when skating, this quote was lower

in the age group 5–14 (60 %) and dropped to about 15 % in the age group 14–17 (about 15 %). Also the rate for using protective clothes was lowest in age group 14–17 (boys 41.8 %; girls 52.2 %). In children and adolescents the rate of self-reported helmet use is lower than estimated by their parents. In all age groups migration background and low socioeconomic status were associated with lower use of protective measures (helmets and protective clothes). The age related data analysis should be the starting point in prevention measures for specific risk groups considering migration and socioeconomic status. Prevention activities in traffic should focus on families with low social status. Adolescents should be specifically and adequately addressed regarding the benefits of certain safety measures when riding a bicycle and when skating.

**Keywords** Health Survey - Children - Adolescents - Injuries - Falls - Socioeconomic status - Migration status - Helmet rates - Protective measures

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 728-735

H. Neuhauser · M. Thamm

### **Blood pressure measurement in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Methodology and initial results**

**Abstract** Hypertension is one of the main risk factors for cardiovascular disease and ranks among the leading causes of morbidity and mortality worldwide. Hypertension in children is rare, but the blood pressure rank in relation to peers is often maintained from childhood into adulthood and is therefore of great public health relevance. For this reason, one of the aims of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) was to collect representative data on blood pressure in children aged 3 to 17 years, in order to create an epidemiological basis for a comprehensive analysis of blood pressure in children and adolescents in Germany. Two oscillometric blood pressure measurements were obtained using an automated device (Datascope Accutorr Plus) and two readings of systolic, diastolic and mean arterial pressure and of heart rate were obtained in a standardised fashion in 14.730 children (7203 girls and 7527 boys). The main aim of this article is a detailed description of the blood pressure measurement in KiGGS, which is important for the interpretation of our findings compared to other studies. Our initial results on the distribution of systolic and diastolic blood pressure confirm previous findings of increasing blood pressure with age and height and of higher systolic blood pressure levels among boys compared with girls from the age of 14 years.

**Keywords** Health Survey - Children - Adolescents - Blood pressure - Blood pressure measurement - Oscillometric blood pressure measurement - Hypertension

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 736-743

B.-M. Kurth · A. Schaffrath Rosario

### **The prevalence of overweight and obese children and adolescents living in Germany. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Overweight and obesity are an increasing problem: worldwide, for Germany and for children and adolescents. Until now there have been no representative and age-specific assessments of the prevalence of obesity among children and adolescents in Germany. Thus, the standardised height and weight measurements gathered in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) have, for the first time, provided national, representative data about overweight and obesity in young people. The terms 'overweight' and 'obese' are defined based on percentiles of the body mass index (BMI) of the Kromeyer-Hauschild reference system. Of children and adolescents between the ages of 3 and 17, 15% exceed the 90th BMI percentile of the reference data and are thus overweight, 6.3% exceed the 97th BMI percentile and thus suffer from obesity by this definition. The proportion of overweight rises from 9% of 3–6-year-olds to 15% of 7–10-year-olds and 17% of 14–17-year-olds. The prevalence of obesity is 2.9%, 6.4% and 8.5% for the same age groups respectively. No

clear differences between boys and girls or between East and West Germany are detected. Children are at a higher risk of being overweight or obese if they have a lower socioeconomic status, have a migration background, or have mothers who are also overweight.

**Keywords** Health survey - Children - Adolescents - Body mass index BMI - Overweight - Obesity

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 744-749

M. Thamm · U. Ellert · W. Thierfelder · K.-P. Liesenkötter · H. Völzke

### **Iodine intake in Germany. Results of iodine monitoring in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Iodine is an essential trace element which is found in too low quantities in the soil in Germany. The resulting iodine deficiency in human beings is countered by iodine prophylaxis, essentially consisting of iodised table salt and the iodisation of agricultural animal feed. In iodine monitoring during the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), the thyroid volumes of all children and adolescents from six years of age were determined using sonography. To assess iodine intake among the population, iodine excretion in the urine was also measured. The median ioduria value was 117 µg/l, putting it at the lower end of the scale of 100–200 µg/l recommended by the World Health Organisation. It can be concluded from these results that the iodine prophylaxis has been successful and that iodine intake has improved compared with the past. In accordance with the WHO recommendations there is no iodine deficiency in Germany any more; however, at the same time the population's iodine intake is at a relatively low level. The aim is at least to keep up what has been achieved, meaning that measures to improve iodine intake must not be allowed to slacken.

**Keywords** Health survey - Children - Adolescents - Iodine - Iodine intake - Thyroid gland

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 750-756

C. Scheidt-Nave · U. Ellert · U. Thyen · M. Schlaud

### **Prevalence and characteristics of children and youth with special health care needs (CSHCN) in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In order to arrive at population-based estimates on the prevalence and characteristics of children and adolescents with specific health care needs (CSHCN), screening instruments focussing on the consequences of physical, mental and behavioral problems rather than on medical diagnoses have been developed. One of the most feasible and widely tested instruments, the CSHCN screener was added to the self-administered questionnaire for parents of children participating in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). The overall weighted prevalence of CSHCN was 16.0% among boys and 11.4% among girls. Children at kindergarten or school age were more than 2-3 times more likely to screen positive compared to toddlers. Up to 14 years, the sex difference persisted through all age groups and was most pronounced between the ages of 3 and 10 years. Children with a migrant background had significantly lower rates of CSHCN compared to non-migrants. This was particularly true for boys (8.0% vs. 17.1%). CSHCN status was not related to social status, urbanization or residence in former West vs. former East Germany. Except for the lack of association with social status, these results are in good accordance with observations from the US National Survey of CSHCN.

**Keywords** Health survey - Children - Adolescents - Health care needs - Chronic diseases - CSHCN screener

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 757-770

W. Thierfelder · R. Dortschy · B. Hintzpeter · H. Kahl · C. Scheidt-Nave

### **Biochemical measures in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In the framework of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) a variety of biochemical parameters was determined in order to provide objective information on health status and particular health risks, in addition to parent interview data and anthropometric measurements. Overall 43 parameters covered three areas of particular public health interest: micronutrient deficiency, seroepidemiology of infectious diseases and immunization status, and risk indicators or risk factors for chronic non-communicable diseases. A review of available evidence regarding valid reference or cutoff values as well as the standardization of laboratory methods led to the categorization of these parameters into five classification categories. Here, we discuss the present first descriptive results on selected parameters representing the various categories. In order to determine the public health impact of measurement results, and perhaps even derive normative reference data relevant to health care, more detailed analyses will be required. In the first step, these will focus on cross-sectional analyses of the association between biochemical parameters and other health-related anthropometric and sociodemographic variables. Intermediate and long-term objectives will include the construction of multidimensional reference values taking into account several laboratory data and other clinical information at the same time, and the prognostic validation of reference or cutoff values based on a follow-up of the study participants for clinical outcomes.

**Keywords** Health-Survey - Children - Adolescents - Biochemical measures

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 771-774

S. Diedrich · E. Schreier

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): State of immunity against poliomyelitis in German children**

**Abstract** One of the goals of the WHO is the worldwide eradication of poliomyelitis in the coming years. Europe was declared poliofree in 2002, but increasing migration may lead to a come-back of circulating polioviruses. A high level of population immunity protects against imported wild viruses from endemic areas. The first seroprevalence data since the switch from live to inactivated vaccine in Germany (OPV to IPV) are provided. A serum panel was tested (n=2,046) in order to study the serological status against poliomyelitis. The microneutralization test on RD cells was used. Overall, neutralizing antibodies against poliovirus types 1, 2 and 3 were detected in 97.4%, 97.6%, and 93.6% of samples, respectively. Of the test persons, 91.7% had antibodies against all three virus types. Only 26 children simultaneously lacked neutralizing antibodies for all three serotypes (1.3%). No significant correlation between gender, region (East/West), migration status (with/without migration background) and antibody prevalence to polioviruses was found. The seroprevalence of antibodies against all three types of polioviruses indicates a very high level of population immunity in German children. It must be maintained through consequently performed vaccination programmes.

**Keywords** Health survey - Children - Adolescents - Neutralizing antibodies - Poliovirus - Poliomyelitis



Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 775-783

A. Starker · T. Lampert · A. Worth · J. Oberger · H. Kahl · K. Bös

### **Motor Fitness. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Motor fitness was investigated in children and adolescents aged 4–17 using specific short tests. These tested the motor abilities: co-ordination, strength, cardiorespiratory fitness and flexibility. Among the 4–10 year olds, the focus of the investigation was on recording coordination, strength and flexibility; in the age group of the 11–17 year olds it was on recording cardiorespiratory fitness. The current investigation describes motor fitness based on the tested abilities according to age, sex and sociodemographic aspects. In all the test tasks, as expected, there are better results from older children and adolescents than from younger ones. Among the 4–10 year olds, girls display a slightly higher motor fitness in five out of the six tasks. In cardiorespiratory fitness, the cycle ergometer test for the 11–17 year olds shows better results for boys. The results indicate that there is a correlation between migrant status, social status and motor fitness. The shown differences point out that possible intervention programmes should be specifically attuned to age and sex as well as to the concerns of children and families with a migrant background and those of low social status. These collected data on motor fitness produced a database, representative of Germany. This will enable statements on state and development of motor fitness in children and adolescents in the future.

**Keywords** Health survey - Children - Adolescents - Co-ordination - Strength - Flexibility - Cardiorespiratory fitness

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 784-793

H. Hölling · M. Erhart · U. Ravens-Sieberer · R. Schlack

### **Behavioural problems in children and adolescents. First results from the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Mental health problems in children and adolescents constitute health impairments with major implications regarding individual wellbeing as well as daily and social functioning. In addition, these problems often burden the social partners of the individual. Within the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), the parents of 14478 children and adolescents aged 3–17 answered the Strengths and Difficulties Questionnaire (SDQ) which assesses behavioral problems and strengths in the areas emotional problems, hyperactivity, behavioral problems, peer problems and prosocial behavior. According to the results of the Total Difficulties Score (SDQ) 11,5 % girls (G) and 17,8 % boys (B) are classified borderline or abnormal, respectively. 92,5 % (G) and 86,3 % (B) display an adequate pro social behavior. Most prevalent problem areas are behavioral problems (G = 11,9 %, B = 17,9 %), emotional problems (G = 9,7 %, B = 8,6 %) and hyperactivity problems (G = 4,8 %, B = 10,8 %). The test-data of approximately 8,1 % of the respondents with high socio-economic status (SES), 13,4 % of those with middle SES and 23,2 % of those with low SES hinted at mental health problems. Migrants are more frequently affected than non-migrants. Results point at the need for early detection and prevention of commencing mental health problems. Especially the noneasily accessible groups like those with low socioeconomic status or migrants have to be considered.

**Keywords** Health survey - Children - Adolescents - SDQ - Mental health

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 794-799

H. Hölling · R. Schlack

### **Eating disorders in children and adolescents. First results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Eating disorders are included in the category of mental and behavioural disorders (ICD 10). They are among the most common chronic health problems encountered in children and adolescents. A total of 7,498 children and adolescents (weighted) aged 11 to 17 years answered the SCOFF questionnaire, a screening instrument to identify cases of suspected eating disorder. Parallel to the SCOFF questionnaire, further factors for possible eating disorders, such as the Body Mass Index (BMI), information on abnormal behaviour (using the Strengths and Difficulties Questionnaire, SDQ) smoking, sexual and body self-image assessment, were gathered to substantiate the results. In total, 21.9 % of the children and adolescents in Germany aged 11 to 17 years showed symptoms of eating disorders. With 28.9%, girls are more frequently affected than boys (15.2 %); this difference is highly significant. In the presence of almost identical initial values, the rate of subjects with abnormal SCOFF scores increases, starting from age 11 years, in girls as they age, while it drops in boys. Children and adolescents with low socioeconomic status (SES) are, with 27.6 %, almost twice as often affected than those with high SES (15.6 %). Migrants have an approx. 50 % higher rate compared to nonmigrants. A 2.5-fold increase in the percentage of individuals with normal weight who perceive themselves as too fat is found among those with abnormal SCOFF scores. Individuals with abnormal SCOFF scores smoke more and report more frequently about sexual harassment. Because of the severity, the tendency to chronification and the protracted therapy of the clinically apparent disorders, effective concepts for prevention should be developed.

**Keywords** Health survey - Children - Adolescents - Eating disorders - SCOFF - Socioeconomic status

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 800-809

M. Erhart · H. Hölling · S. Bettge · U. Ravens-Sieberer · R. Schlack

### **The German Health Interview and Examination Survey for Children and Adolescents (KiGGS): Risks and resources for the mental development of children and adolescents**

**Abstract** Along with the salutogenetic approach in health sciences, the quest for factors exerting a protective effect on mental development and health has increasingly gained importance, complementing the study of risk factors. A total of 6,691 children and adolescents aged 11 to 17 years answered questionnaires on personal, social and family resources as part of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Children with low socioeconomic status (SES) more frequently show deficits in their personal, social and family resources. Similarly, in children with migration background a higher percentage with poorly developed personal and social protective factors is found. Older children report less family resources but more social resources than younger children; in comparison to boys, girls have more social but less personal resources at their disposal. Clear connections are observed between protective factors and health-related risk-taking behaviour. Deficits in personal and family resources are associated with an increased risk for smoking. Although an increased percentage of smoking and alcohol consuming children and adolescents is found to be associated with well-developed social resources, the risk for drug experiences is not increased. The results prove the necessity to build up protective factors as a preventative measure. Especially in children and adolescents with weak protective factors, an increased risk of mental health problems can be expected in the presence of stressful events.

**Keywords** Health survey - Children - Adolescents - Risks & protective factors - Mental health

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 810-818

U. Ravens-Sieberer · U. Ellert · M. Erhart

### **Health-Related Quality of Life of Children and Adolescents in Germany. Norm Data from the German Health Interview and Examination Survey (KiGGS)**

**Abstract** This study investigates the health-related quality of life of children and adolescents in Germany, using the internationally employed KINDL-R questionnaire for measuring the health-related quality of life of children and adolescents. In the National Health Interview and Examination Survey for Children and Adolescents (KiGGS) the parents of 14,836 children and adolescents aged 3–17 years completed the KINDL-R, as well as 6,813 children and adolescents (11–17 years old). The reliability (Cronbach's alpha = 0.85) and validity of the measurements using the KINDL-R were confirmed. The differences in health-related quality of life of children and adolescents from different social backgrounds and with different health statuses, which were to be expected on theoretical grounds, were demonstrated by the KINDL-R scores (size of effect “d” up to 1.52). The means and percentiles were calculated for the total sample as well as stratified by age group, sex, geographical region (East/West), migratory status and socio-economic status. The results of this study can be used as representative, normative data for the population of children and adolescents in Germany in general, as well as stratified for sociodemographic and socio-economic subpopulations, in order to interpret test scores on health-related quality of life (KINDL-R).

**Keywords** Health Survey - Children - Adolescents - KINDL-R - Quality of life

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 819-826

R. Schlack · H. Hölling

### **Children's and adolescents' experiences of violence based on subjective self-reporting. First results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** Experiences of violence in childhood and adolescence are connected with potentially serious consequences for physical and psychological health. Children and adolescents can experience violence as the perpetrator, the victim or the perpetrator/victim. As part of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) 3382 boys and 3237 girls answered questions on the prevalence of experiences of violence over 12 months, divided into experiences as a perpetrator and as a victim. There were also questions on people's views on the propensity to instrumental and expressive violence. Altogether, 82.5% of girls (G) and 67.2% of boys (B) had not been involved in an act of violence in the last 12 months. 19.6% (B) and 9.9% (G) had been perpetrators; 5.2% (B) and 3.9% (G) had been victims and 7.6% (B) and 3.6% (G) had been perpetrators/victims of an act of violence. The amount of violence suffered by respondents with a high socioeconomic status (SES) was the lowest, with 81.0% never having been involved in acts of violence, compared with those with a lower SES (68.3%) and a medium SES (76.4%). Pupils at Hauptschule (school at lower secondary level providing a basic general education) and Gesamtschule (comprehensive school) as well as adolescents with a migrant background are more often affected by experiences of violence and have more permissive attitudes towards violence than those at Gymnasium (high school) or Realschule (school at lower secondary level providing more extensive general education) and children of non-migrants. Social disadvantage and a migrant background are associated with adolescents having more exposure to and a higher propensity for violence. Intervention programmes and improvements to basic social conditions may have a preventative effect. As no distinction can be made between familial violence and other forms of violence using the KiGGS data, care should be taken in interpreting it. Its significance lies in identifying risk groups.

**Keywords** Health survey - Children - Adolescents - Violence - Socioeconomic status

Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 827-835

R. Schlack · H. Hölling · B.-M. Kurth M. · Huss

### **The prevalence of attention-deficit/hyperactivity disorder (ADHD) among children and adolescents in Germany. Initial results from the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** The cardinal symptoms of attention-deficit/hyperactivity disorder (ADHD) are inattention, hyperactivity and impulsivity. Etiologically, ADHD is mainly put down to genetic causes; it entails a considerable range of psychosocial problems for those affected and their social environment. The parents of a total of 7,569 boys (B) and 7,267 girls (G) aged 3–17 who took part in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) answered a self-administered questionnaire including an ADHD diagnosis question and the Strengths and Difficulties Questionnaire (SDQ). In addition behavioural observations of 7,919 children (aged 3–11) were carried out during the medical and physical tests. Participants whose parents reported that they had ever been given an ADHD diagnosis by a doctor or psychologist were classified as ADHD cases. Participants were classified as suspected cases of ADHD if they had a value of  $\geq 7$  on the SDQ inattention/hyperactivity scale. ADHD had ever been diagnosed in 4.8 % of the children and adolescents altogether (B: 7.7 %, G: 1.8 %). Another 4.9 % of the participants can be considered as suspected cases. Already 1.8 % of the preschoolers had been given an ADHD diagnosis. At primary school age (7–10 years old) the frequency of diagnosis rises sharply. At age 11–17, ADHD had ever been diagnosed in 1 in 10 boys and 1 in 43 girls. ADHD had been diagnosed significantly more frequently among participants of low socio-economic status (SES) than among participants of high SES. A diagnosis of ADHD is reported less often for migrants, they rank more frequently among the suspected cases. The discrepancy between confirmed and suspected cases of ADHD among migrants may point to lower diagnosis rates or lower utilization of medical services. The short- and long-term medical, social and health-economic effects of ADHD illustrate the major public health relevance of the disorder. As for prevention, the high share of genetic factors in ADHD etiology primarily suggests secondary prevention (early support and early diagnosis) and tertiary prevention measures. Further analysis of the KiGGS data could prospectively identify risk groups more precisely and refine preventional approaches.

**Keywords** Health survey - Children - Adolescents - ADHD - Frequency of diagnosis - SDQ - Socioeconomic status

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 836-850

P. Kamtsiuris · E. Bergmann · P. Rattay · M. Schlaud

### **Use of medical services. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** The use of operations, visits to doctors and early diagnostic tests for children are examples of different services selected from the whole spectrum of preventative and therapeutic health service provisions in childhood and adolescence. In the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), which is representative for Germany, 17,641 children and adolescents aged 0–17 or their parents were questioned on subjects such as their use of medical services. The use made of individual early diagnostic tests for children remains above the 90 % limit until the U7 test and drops to 89.0 % at U8, falling to 86.4 % at U9. 81 % of children took part in all the early diagnostic tests provided until age 6 (U3 to U9). Another 16 % only took advantage of some parts of this service and 3 % of the children never went to one of these check-ups. As was to be expected, the annual rate of visits to paediatricians drops as children get older from 95.1 % for 0–2-year-olds to 25.4 % of the 14–17-year-olds, while the rate of visits to general practitioners rises from 11.8 % to 53.1 %. If one tracks the rate of visits to specialist doctors all the way across childhood and adolescence, different paths emerge: while children aged 3–6 most often visit the ear, nose and throat doctor, at primary school age they mainly see opticians, and 14–17-year-olds most often visit doctors of internal medicine, dermatologists and surgeons. 37.1 % of the 0–17-year-old children and adolescents had undergone an

operation. In order of declining frequency, the operations named were adenoidectomy (15.2 %), tonsillectomy (5.9 %), herniotomy (3.6 %) and appendectomy (2.4 %). Circumcisions had been carried out on 10.9 % of the boys. The different way medical services are used in different subgroups may not only depend on medical factors but also on social factors, medical attitudes and the availability of services provided.

**Keywords** Health Survey - Children - Adolescents - Early diagnostic tests for children - Visits to doctors - Operations - Medical care

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 851-862

C. Poethko-Müller · R. Kuhnert · M. Schlaud

### **Vaccination coverage and predictors for vaccination level. Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** The level of childhood immunisation is an acknowledged indicator for health prevention. In Germany, vaccination is not compulsive. Continuous representative data derive only from school health examinations. From May 2003 until May 2006 the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) was conducted and vaccination information on 16,460 participants was obtained. Using data on the vaccination cards, it was possible to make detailed analyses of vaccination coverage in children up to the age of 17. Different vaccine types were taken into consideration in defining the term 'immunisation coverage'. The average prevalence of full immunisation for tetanus, diphtheria und polio as well as the coverage for the first dose of measles, mumps and rubella (MMR) vaccination was above 90% in children aged 2–17 years. Vaccination coverage for pertussis, Hib and hepatitis B is higher in younger than in older age groups. Compliance with the recommendation to have a second MMR dose and to make up of hepatitis B and pertussis immunisation is still low, especially in adolescents. In 7- to 17-year-old children the additional booster (recommended for 5- to 6-year-old children) is frequently missing.

**Keywords** Health Survey - Children - Adolescents - Vaccination - Vaccination coverage - Predictors

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 863-870

H. Knopf

### **Medicine use in children and adolescents. Data collection and first results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), data on the current use of medicines during the last 7 days prior to the examination were collected from 17,450 subjects aged 0 to 17 years by means of a standardised interview conducted by a physician. 50.8 % of all children and adolescents reported to have used at least 1 medication. Prevalence was found to be highest (74.9 %) in the age group 0 to 2 years. Girls showed with 53.1% a significantly higher prevalence rate than boys (48.7 %). Children from families with low socioeconomic status and children from migrant families stated a less frequent use of medication compared to children from families with higher socio economic status and no migration background. Most frequently, the boys and girls used medicines for the treatment of respiratory tract conditions (ATC code R00: 16.8%). This was followed by Alimentary System and Metabolism (ATC code A00: 16.0%) and Dermatological Preparations (ATC code D00: 9.7%). The most frequent indications included with 12.4% of all medicines reported Other Specified Prophylactic Measures (ICD code Z29.8), with 11% Acute Rhinopharyngitis (ICD code J00), and with 10.9 % Cough (ICD code R05). Most of the drugs named were prescribed by a doctor (58%), one quarter (25%) was independently bought without prescription, 14% came from other sources, including the medicine chest, and 2% were prescribed by a non-medical practitioner. Regarding the duration of use, short-term use (less than 1 week: 55%) was encountered most frequently, while a duration of use of at least one year was reported for 13% of all medicines



named. The results presented here describe the key points of medicine use among children and adolescents in Germany and are representative for this population segment. Based on the extensive data collected, further aspects, such as co- and multi-medication, are addressed. In addition, special drug segments of public health interest shall be represented in the future.

**Keywords** Health survey - Children - Adolescents - Medicine use - ATC classes - Indication

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 871-878

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### **Mental health of children and adolescents in Germany. Results from the BELLA study within the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** The Mental Health Module (BELLA study) examines emotional well-being and behaviour in a representative sub-sample of 2,863 families with children aged 7 to 17 from the National Health Interview and Examination Survey for Children and Adolescents (KiGGS). The prevalence of mental health problems was determined using the Strengths and Difficulties Questionnaire (SDQ) and additional standardised screening measures. Of children and adolescents, 21.9 % (95 %CI: 19.9–24.0) showed signs of mental health problems. The psychiatric disorders observed included anxiety (10.0 %; 95 % CI: 8.7–11.6), conduct disorder (7.6 %; 95 % CI: 6.5–8.7) and depression (5.4 %; 95 % CI: 4.3–6.6). Of the risk factors examined, adverse family climate and low socioeconomic status stand out particularly as negative contributors. When several risk factors occur simultaneously, the prevalence of mental health problems increases markedly. Conversely, positive individual, family and social resources coincide with an absence of mental health problems. Children and adolescents with mental health problems display distinctly impaired health-related quality of life, and far from all of them are receiving treatment. Identifying high risk groups therefore requires the assessment of available resources in addition to the usual risk factors for mental and subjective health. Strengthening these resources should be a key objective, both in prevention and in interventions.

**Keywords** Health survey - Children - Adolescents - Mental health - Protective factors - Risk factors

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 879-888

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### **The module “Motorik” in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). Motor Fitness and physical activity of children and young people**

**Abstract** Motor fitness and physical activity are important aspects of a healthy development in childhood and adolescence. However, the assessment of motor fitness and physical activity is not subject to standardized criteria; furthermore, the samples investigated do not provide a representative image of the whole population. Therefore, the existing data only allow very limited statements on the state and development of motor fitness and physical activity. The “Motorik” module, as part of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), offers nationwide representative data on the motor fitness and physical activity of children and adolescents for the first time. Besides the baseline-analysis, another aim is to analyse the complex relationship between motor fitness, physical activity and health. Motor fitness, based on the systematisation of motor abilities, was assessed using a test profile. The test profile consists of 11 items measuring cardiorespiratory fitness, strength, coordination and mobility. Physical activity was assessed using a questionnaire containing 51 items on the duration, intensity and frequency of physical activity in everyday life, during leisure time, at school and in sports clubs. The above-mentioned questionnaire subtopics were supplemented by questions on the weekly prevalence of at least 60 minutes of daily physical activity, on material and local conditions, as well as on cognition and motivation for physical activity. In the years 2004 to 2006, the motor fitness and physical activity of 4,529 children and young people between the ages of 4 and 17 years was investigated on 168 sample points in the context of the

“Motorik” module. Half of the children and adolescents investigated belong to the middle class, approximately 15% have a background of migration. The majority of the subjects come from small towns, about a quarter live in the city, less than 20% are settled in rural areas.

**Keywords** Health survey - Children - Adolescents - Motor fitness - Physical activity - Representative data

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 889-894

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### **German Environmental Survey for Children (GerES IV) in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). First results**

**Abstract** The German Environmental Survey for Children (GerES IV) is the environment-related module of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) of the Robert Koch Institute and the fourth GerES of the Federal Environment Agency. The main objective of GerESs is to analyse and document the extent, distribution and determinants of exposure to environmental pollutants of the German general population. GerES IV was performed from 2003 to 2006. A total of 1.790 children aged 3–14 years from 150 sampling locations participated in GerES IV. Samples of blood, urine, tap water, house dust and indoor air were analysed. Hearing tests, measurements of traffic noise and interviews to get exposure-related information were conducted. First results indicate a clear decrease of the exposure to arsenic, lead and mercury. Cotinine concentrations in urine can be used to classify the exposure of children to environmental tobacco smoke. The examination of the tap water used in the subjects' households indicates that in some households the guideline values of the German Drinking Water Ordinance were not always met. This is the case for nickel, copper and lead which are used as pipe material for domestic plumbing.

**Keywords** Health survey - Children - Adolescents - GerES - Environment - Human biomonitoring - Drinking water

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 895-901

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### **The Federal State Module Schleswig-Holstein in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** From August 2004 to June 2005, the Robert Koch Institute conducted the fieldwork for the Schleswig-Holstein module of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). The KiGGS study is a nationwide representative survey of the health of children and adolescents aged 0 to 17 years. By increasing the sample size in the age group 11 to 17 years in Schleswig-Holstein, the module study generated information which is representative for this federal state. For this end, further 18 locations in this federal state were included in the module study in addition to the existing 5 study locations in Schleswig-Holstein and a study programme which was slightly reduced compared to the core survey was realised. A total of 1,931 subjects were examined in Schleswig-Holstein: 1,730 in the federal state module and 201 in the core survey. The participation rate was 69.5% in the module study. The percentage of quality-neutral drop-outs was 4.0%. The federal state module was funded by the Ministry of Social Welfare, Health, Family, Youth and Seniors of the Federal State of Schleswig-Holstein. The data collected were used for health reporting on a federal state level.

**Keywords** Health survey - Children - Adolescents - Schleswig-Holstein - Module

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Bundesgesundheitsbl – Gesundheitsforsch – Gesundheitsschutz 2007 · 50: 902-908

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### **EsKiMo – the nutrition module in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)**

**Abstract** In a module of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), the dietary behaviour of 6–17-year-olds was assessed from January to December 2006. The study, named EsKiMo (Eating Study as a KiGGS Module), was performed by the Robert Koch Institute together with the division of nutrition and consumer education at the University of Paderborn. It was funded by the Federal Ministry of Food, Agriculture and Consumer Protection. Parents of participants younger than 12 years were asked to conduct a 3-day dietary record. Participants of 12 years and older were personally interviewed about their eating behaviour during the last four weeks using DISHES (Dietary Interview Software for Health Examination Studies). In addition, they were asked to fill in the KiGGS food frequency questionnaire a second time. Furthermore, all participants were asked about their socio-demographic background, leisure time activities, supplement use, meals at school, body weight and height. The study will provide up-to-date, representative data on the nutrition of children and adolescents in Germany. The analyses will include the amounts of foods and food groups consumed as well as the nutrient intake. By connecting these nutrition data with other health data from KiGGS, comprehensive analyses of relationships between nutrition and health are possible.

**Keywords** Health survey - Children - Adolescents - Nutritional epidemiology - Dietary assessment methods

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