



C3: EPIDEMIOLOGISCHE FORSCHUNG: METHODISCHE ANSÄTZE C3 : RECHERCHE EPIDEMIOLOGIQUE: APPROCHES METHODIQUES

REPRODUCIBILITY OF THE CARDIO-ANKLE VASCULAR INDEX (CAVI) IN CAUCASIANS (SAPALDIA 3)

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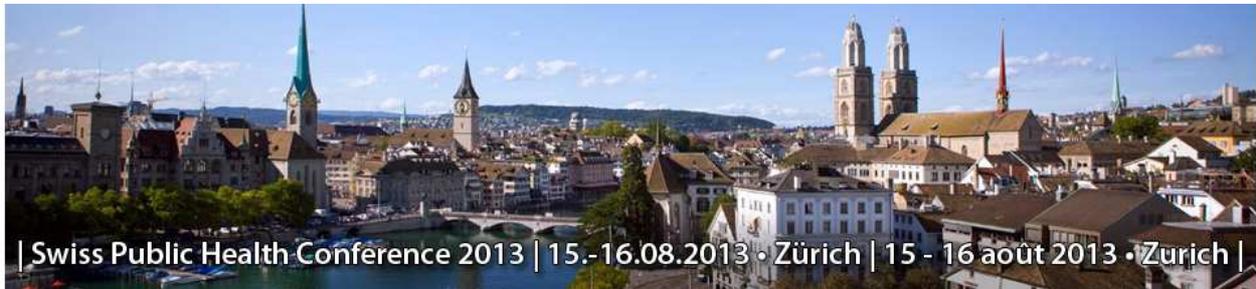
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Purpose: This nested study of the second follow-up of the Swiss Cohort Study on Air Pollution and Lung and Heart Diseases in Adults (SAPALDIA 3) aimed at analysing in detail the reproducibility of the arterial stiffness marker cardio-ankle vascular index (CAVI) in Caucasians.

Methods: In a subsample of the SAPALDIA 3 cohort of 105 persons aged 50-80yrs (50 males, 55 females, 63.0±6.9yrs) two measurements of CAVI were taken on each of two days within 3 months using a VaseraVS-1500 vascular screening system (Fukuda Denshi) in supine position after 15 min of rest. The analyses involved mean coefficients of variation (CV), Bland-Altman Plots (BAP) and intraclass correlation coefficients (ICC). In order to allow for a fieldworker effect on the measurement of CAVI a mixed linear model with a fixed effect of time (i.e., first and second measurement day) and random effects for subject and time within subject (measurement date) and fieldworker was applied.

Results: The CV of CAVI was 4.4% and the ICC reflecting the ratio of between and within subject variability was 0.803. Both were almost the same when excluding subjects with differing fieldworker (4.3% and 0.805, respectively; N=82). The limits of agreement of the BAP for repeated CAVI measurements were -1.155 to 1.445 with a mean difference of 0.145 (CI 0.019-0.271). The BAP displayed no particular dispersion pattern. The mixed linear model revealed that the random subject effect accounted for 75.7% of the variability of CAVI measurements, the subject-specific time effect for 14.1%, the fieldworker effect for 5.7% and short-term variability for 4.5%.

Conclusions: These results are in line with previous findings in Asian populations and show that the measurement of CAVI is highly reproducible also in Caucasians. Since the fieldworker effect is negligible CAVI can be regarded as an easy-to-apply tool for population wide application.



INTEGRATED ELECTROMAGNETIC FIELD EXPOSURE ASSESSMENT: MODELLING, PERSONAL MEASUREMENTS, QUESTIONNAIRES, MOBILE PHONE TRAFFIC DATA AND APPS

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Background

The ongoing HERMES (Health Effects Related to Mobile Phone use in adolescentS) study aims to prospectively investigate whether the exposure to radiofrequency electromagnetic fields (RF-EMF) emitted by mobile phones or the use of mobile phones itself affects cognitive functions or causes behavioural problems and non-specific health disturbances in adolescents. The exposure assessment will be approached using propagation modelling, questionnaire data, objective mobile phone traffic data, personal RF-EMF measurements, apps (mobile phone applications) and the fact that calls on the UMTS (Universal Mobile Telecommunications System) network cause on average 100-500 times less exposure than calls on the GSM (Global System for Mobile Communications) network.

Aims

The objective is to predict the mean RF-EMF exposure for the study population and to differentiate between radiation and mobile phone training effects.

Methods

Objective mobile phone traffic data including the network being used is provided by the mobile phone operators. Residential exposure from fixed site transmitters will be assessed using a validated geospatial propagation model and RF-EMF measurements in schools were carried out. A subgroup of the study participants will participate in personal measurements carrying a portable measurement device and filling in a time-activity diary app, which records the locations and activities and tracks the position. Another app traces the field strength and the emission source of different frequency bands and yet another app records how the mobile phone is used in terms of laterality and the amount of calls and texts.

Results

441 adolescents of 24 schools participated in the baseline investigation. Preliminary measurement results of 22 schools show an average RF-EMF exposure of 0.134V/m and a median of 0.121V/m. Highest observed exposure value was found to be 0.225V/m.

Currently, detailed mobile phone traffic data for 191 students are available. 52 participants used mainly the UMTS network for calls (>75% on UMTS), whereas 76 participants used mainly the GSM network (<25% on UMTS) and 63 participants used both networks (25-75% on UMTS).

Conclusion

We apply an integrated exposure assessment method in order to predict both, RF-EMF exposure and duration of communication device use. Since the latter may induce non-radiation behavioural effects in adolescents, the mutual effect of both parameters will be estimated in the final data analysis.



FUNCTIONAL DATA ANALYSIS OF AMBULATORY BLOOD PRESSURE MONITORING IN SKIPOGH

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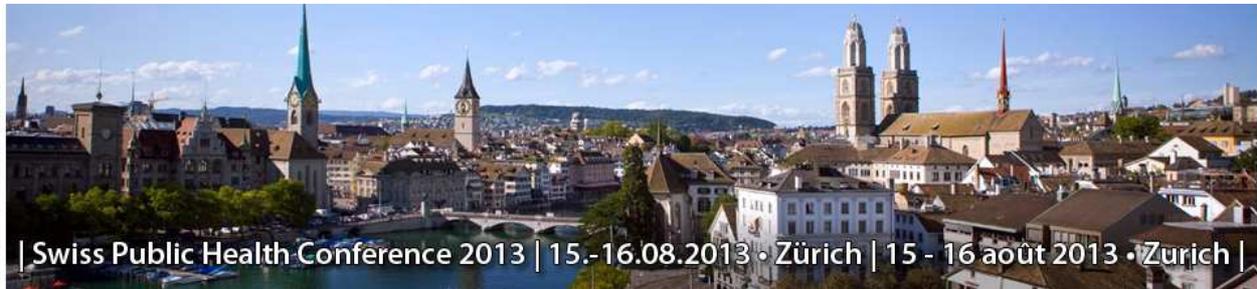
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Background: Variability of the hemodynamic markers blood pressure and pulse rate predicts cardiovascular risk. Provided by ambulatory blood pressure monitoring, population-based studies may provide data on time periods sensitive to variation. We hypothesized to identify periods of high variability despite the challenging setup within a heterogeneous sample.

Design and methods: We randomly recruited nuclear families from the general adult population in Lausanne, Geneva and Berne. Ambulatory blood pressure and heart rate were measured using validated Diasys Integra devices every 15 and 30 min during day and night, respectively. Using functional data analysis, individual continuous blood pressure and heart rate profiles were obtained by penalized spline smoothing. Furthermore, the complex covariance structure was decomposed into more comprehensible components of variability using functional principal component analysis.

Results: Valid measurement data points were available for 95% and 85% during the day and at night, respectively, of the 685 participants. Focusing on the transition period from day to night (bedtime plus or minus 3 hours), we identified three principal sources of variability. The leading component of variability accounted for about 85% of total variability and corresponded to the overall level of blood pressure or heart rate (i.e. whether the person's level was globally above or below the mean). The second component explained around 10% of variability and represented the day-night difference. The third component accounted for 2-4% of variability and captured the temporal delay of the nocturnal dipping (i.e. whether the person's values decrease earlier or later than for an average person).

Conclusion: In this novel exploratory method, the overall level and the size and timing of the nocturnal dipping were the most important sources of variability in ambulatory blood pressure and heart rate profiles. We identified periods subject to high variability which should be further explored with respect to participants' characteristics.



HOW ACCURATE ARE ASSESSMENTS OF COPD EXACERBATIONS THROUGH PATIENTS' SELF-REPORT?

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Background

Although acute exacerbations of chronic obstructive pulmonary disease (COPD) are a common and increasingly important outcome measure in clinical trials and observational studies, the ascertainment of exacerbations is difficult. It is currently unclear how misclassifications of exacerbations influence measures of effect. The aim of this study was to evaluate the accuracy of different methods to ascertain COPD exacerbations in longitudinal studies and to estimate the effect of misclassification in randomised trials.

Methods

We included 409 primary care COPD patients from the ICE COLD ERIC cohort. We used event-based definition of exacerbations that required newly prescribed systemic corticosteroids and/or antibiotics to distinguish between new exacerbations and those which slowly resolved or relapses. Methods to ascertain exacerbations over 3 years included (1) 6-months follow-ups by patients' self-report and (2) review of patient charts by an experienced physician. These two methods were compared against reference standard of adjudication committee (AC) where 3-4 experienced physicians independently adjudicated exacerbations followed by AC meeting where consensus on final classifications was reached. We calculated sensitivity and specificity of patients' self-reports and single expert judgements by categorising the number of exacerbations into two groups (0 exacerbations, ≥ 1 exacerbations) and re-estimated the effects of long-acting bronchodilators vs. placebo on exacerbations from a meta-analysis by correcting for misclassification.

Results

648 exacerbations were identified in total by the AC for the 409 patients during 3 years. 241 patients (58.9%) had at least 1 exacerbation. Rate-ratio for exacerbations/patient-year was 0.53. Patients' self-reports of exacerbations achieved sensitivity of 84% and specificity 76%, exacerbation adjudication by single experts attained sensitivity values from 89 to 96% and specificity values from 87 to 99%. The pooled relative risk reduction from meta-analysis for long-acting bronchodilators vs. placebo changed from 19% (95% CI 12-25%) to 35% (19-48%) when corrected for misclassification.

Conclusions

Conventional methods to ascertain exacerbations in COPD patients without central adjudication are likely to underestimate treatment effects substantially. Use of central or expert adjudication could remarkably reduce sample size requirements