

## Determinants and geographical variation of SARS-CoV-2 transmission risk in the Netherlands

Sophie L Campman, Jizzo R Bosdriesz, Elke M den Boogert, Ivo K Joore, Nicole HTM Dukers - Muijrs, Hannelore M Götz, Irene E Goverse, Tjalling Leenstra, Mariska WF Petrignani, Stijn CFH Raven, Susan van den Hof, Kirsten Wevers, Ewout Fanoy, Maarten F Sch

*Amsterdam University Medical Center- location AMC;Public Health Service of Amsterdam (GGD Amsterdam); Department of Infectious Diseases*

**Introduction:** Source and contact tracing (SCT) has been a cornerstone in preventing transmission of SARS-CoV-2, and is preferably prioritized for cases with a higher transmission risk when the number of cases exceeds SCT capacity. This study aimed to identify factors associated with SARS-CoV-2 transmission risk in the Netherlands.

**Methods:** We analysed routine COVID-19 SCT data of individuals with a polymerase chain reaction (PCR)-confirmed SARS-CoV-2 infection between October 13, 2020 and February 28, 2021 (i.e., the second wave of SARS-CoV-2 infections) in nine Public Health Service (PHS) regions in the Netherlands (covering 47% of the population). Transmission risk was defined as the number of reported non-household close contacts. Using zero-inflated negative binomial regression, we examined the associations between potential determinants and the number of close contacts.

**Results:** We included 242,784 cases (median age 40 years [interquartile range 24-55], 52% female). In total, 93,941 cases (39%) reported  $\geq 1$  non-household close contacts. Being female, under 25 years of age, born in the Netherlands, Suriname, Iraq, or Poland, employed in healthcare, education, or elsewhere, having recently travelled abroad, not having been notified of potential infection by the COVID-19 tracking app (CoronaMelder), initiating SCT  $>4$  days after symptom onset, and residing in the five smaller, less urbanized PHS regions were associated with having more close contacts. The strength of the associations differed significantly between PHS regions.

**Conclusion:** While our findings might partly reflect the accuracy of reporting during, and the overall quality of SCT, the identified determinants of having close contacts could help shape prioritization of SCT when capacity is limited. In order to halt further transmission, we therefore advise that SCT should be prioritised among those under 25 years of age, those employed in healthcare or education, and/or those who recently travelled abroad, as these characteristics were most strongly correlated with having close contacts.

**Conflicts of interest to disclose:** We declare no competing interests

## Work- and Health-related Events and Changes in Body Mass Index during the Covid-19 lockdown. Evidence from the Lifelines Cohort Study in the Netherlands.

Lluís Mangot-Sala, Nynke Smidt, Aart C. Liefbroer

*University Medical Center Groningen; Netherlands Interdisciplinary Demographic Institute (NIDI); Department of Epidemiology*

**Background:** The aim of this study was to identify the main trends in terms of changes in body mass index (BMI) during the Covid-19 pandemic in the Netherlands. Moreover, we aimed to investigate whether work- and health-related disruptive events triggered by the pandemic, such as job insecurity or mental health issues, were associated with such changes in BMI.

**Methods:** Longitudinal data from the Lifelines Covid Questionnaire was used (21 waves between April 2020 and July 2021; n=64,630). Overall BMI trends were analysed using growth curve modelling. Different trajectories were identified using group-based trajectory models. Multinomial regression models were fitted to analyse the main determinants of experiencing changes in BMI during the pandemic.

**Results:** Experiencing disruptive work-related events (e.g. being laid-off or having a temporary contract) and health-related events (e.g. experiencing anxiety or depression symptoms) during the pandemic were associated with changes in BMI, particularly weight gain.

**Conclusion:** Work- and health-related events were strongly associated with changes in BMI (particularly with weight gain) during the Covid-19 pandemic. Although such changes may be partly explained by lifestyle factors, such as diet or physical activity, this study aligns with the existing evidence on the embodiment of stress, suggesting a strong association between disruptive events and changes in body weight.

**Conflicts of interest to disclose:** We declare no competing interests

## Identification of five subgroups of work characteristics among young workers with different degrees of emotional exhaustion: a heterogeneity assessment using latent class analysis

Malte van Veen, Roosmarijn MC Schelvis, Trynke Hoekstra, Paulien M Bongers, Cécile RL Boot, Karen M Oude Hengel

*Amsterdam University Medical Center- location VUmc; Amsterdam Public Health, Societal Participation & Health*

**Introduction:** For the work-related prevention of mental health complaints among young workers, examining the heterogeneity of their working conditions is required to find an appropriate balance between one-size fits all measures and more tailored approaches. It is important not to overlook heterogeneity in a seemingly consistent group of individuals who are given the same label (e.g. young workers). This study aims at assessing the heterogeneity of work characteristic configurations within young workers by identifying subgroups and to assess these subgroups' associations with emotional exhaustion.

**Methods:** Latent class analysis was applied using data from the 2019 wave of the Netherlands Working Conditions Survey of 7301 individuals between the age of 18 and 30 years, who worked more than 16 hours per week. Groups were formed based on twelve work characteristics, educational level, and sex. Differences in emotional exhaustion between subgroups were analyzed using ANOVA and post hoc comparisons.

**Results:** Five subgroups of work characteristics could be identified and were labelled as: (1) "low complex work" (24.4%), (2) "office work" (32.3%), (3) "manual & non-interpersonal work" (12.4%), (4) "non-manual & interpersonal work" (21.0%), and (5) "manual & interpersonal work" (9.9%). Young workers in the latter two groups experienced significantly more emotional exhaustion than young workers in the first three groups. Young workers in the group "manual & interpersonal work" further experienced significantly more emotional exhaustion than young workers in the group "non-manual & interpersonal work". All **Results** could be replicated in the 2017 and 2021 waves of the Netherlands Working Conditions Survey.

**Conclusion:** Young workers reported heterogeneous work characteristic configurations with substantial differences in degrees of emotional exhaustion. Preventing emotional exhaustion should focus on the two interpersonal work subgroups, which showed a high degree of emotional exhaustion. In prevention efforts these groups' configurations of work characteristics should be taken into account.

**Conflicts of interest to disclose:** We declare no competing interests

## The impact of extreme temperatures on birth outcomes in the Netherlands: a nationwide population-based study.

Lizbeth Burgos Ochoa, Pilar Garcia-Gomez, Eric AP Steegers, Tom van Ourti, Loes CM Bertens, Jasper V Been

*Erasmus Medical Center Rotterdam; Department of Obstetrics and Gynecology*

**Introduction:** Climate projections indicate that extreme weather events, such as extreme temperatures, will increase in frequency and severity in the coming years, raising concerns about their potential impact on infant health. The aim of this study was to investigate the effect of in-utero exposure to extreme temperatures on birthweight, low-birth-weight (LBW), small-for-gestational-age (SGA), and preterm birth (PTB). Moreover, we examined the role of socioeconomic status (SES) as a moderator for this effect.

**Methods:** We analysed data from the Dutch perinatal registry on 2,476,772 singleton births that occurred in the Netherlands between 2003 and 2017. The exposure corresponded to the number of days during the pregnancy in which the daily mean temperature fell into each of mutually exclusive temperature bins (8–12°C used as reference). Parametric regression models were used to model the outcome and interaction terms with SES indicators were used to investigate the role of SES as moderating variable. To identify a causal effect, our approach exploited the unpredictability of daily temperature fluctuations while accounting for seasonal and underlying trends.

**Results:** In-utero exposure to an additional hot day (mean temperature >20°C), relative to a day within the 8–12°C range, increased the odds of LBW (OR[95%CI]=1.007 [1.005,1.009]), SGA (OR=1.004[1.003,1.005]), and PTB (OR=1.006[1.005,1.007]). It also led to a reduction in birthweight of 1.47 g (95%CI=1.20, 1.60). Exposure to an additional cold day (< -4°C ) was related to a reduction of birthweight by 0.66 grams (95%CI= 0.27,1.05). It was observed that SES moderated the effect of in-utero temperature exposure on birth outcomes and that the effect was the most detrimental for the low SES group.

**Conclusion.** We found that in-utero exposure to extreme temperatures has an adverse impact on birth outcomes in the Netherlands. The projected increases in extreme temperatures may further exacerbate health disparities in early-life.

**Conflicts of interest to disclose:** We declare no competing interests

## Obesogenic environments and cardiovascular disease risk factors: A pooled analysis of five cohort studies

Paul Meijer, Thao Minh Lam, Ilonca Vaartjes, Eric Moll van Charante, Henrike Galenkamp, Annemarie Koster, Katja van den Hurk, Nicole R den Braver, Marieke T Blom, Trynke de Jong, Diederick E Grobbee, Joline WJ Beulens, Jeroen Lakerveld

*University Medical Center Utrecht; Julius Center for Health Sciences and Primary Care*

**Introduction:** This study aimed to examine the association between combined obesogenic residential neighbourhood characteristics and BMI, systolic blood pressure, and blood lipids, as well as the prevalence of overweight/obesity, hypertension and dyslipidaemia in adults.

**Methods:** Observational cross-sectional design using five Dutch cohort studies: Donor InSight (DIS-III), Healthy Life in an Urban Setting (HELIUS), Lifelines, the Hoorn Study (HS), and The Maastricht Study (TMS). The Obesogenic Built-environmental CharacterisTics (OBCT) index was calculated in a 1000m Euclidean buffer around participants' home addresses and ranged from 0 (leptogenic) to 100 (obesogenic). Components of the index included: healthiness of the food environment, walkability, driveability, and sports facilities. Continuous measures of BMI, systolic blood pressure, LDL-cholesterol, HDL-cholesterol, and triglycerides were analysed using linear regression models. Furthermore, prevalence of overweight/obesity, hypertension and dyslipidaemia was analysed using robust Poisson regression models. All models were adjusted for age, sex, education level and area-level socio-economic status. Cohort-specific estimates were pooled using random-effects meta-analyses.

**Results:** The pooled results show that a 10% increase in OBCT index score was associated with a higher BMI ( $\beta = 0.22$  kg/m<sup>2</sup>; 95% CI: 0.15 to 0.28), and a higher systolic blood pressure ( $\beta = 0.34$  mmHg; 95% CI: -0.09 to 0.77), but not with any of the blood lipids. A 10% increase in OBCT index score was also associated with higher prevalence of overweight/obesity (PR = 1.04; 95% CI: 1.02 to 1.06), and a higher prevalence of hypertension (PR = 1.03; 95% CI: 1.00 to 1.05), but not with dyslipidaemia. Sensitivity analyses showed that a change in buffer size to 500m or 3000m produced similar results .

**Conclusion:** This study provides evidence that a higher OBCT index score is associated with a higher BMI and systolic blood pressure, as well as a higher prevalence of overweight/obesity and hypertension.

**Conflicts of interest to disclose:** We declare no competing interests

## Biphenol and phthalate exposure during pregnancy and the development of childhood lung function and asthma. The Generation R Study.

Tarik Karamass, Chalana Sol, Kurunthachalam Kanan, Leonardo Trasande, Vincent Jaddoe, Liesbeth Duijts

*Erasmus Medical Center Rotterdam; Department of General Pediatrics*

**Background:** Fetal exposure to bisphenols and phthalates may lead to alterations in the respiratory and immune system development in children, and to adverse respiratory health. We aimed to study the associations of fetal bisphenols and phthalates exposure with lung function and asthma at age 13 years.

**Methods:** This study among 1,020 children was embedded in a population-based prospective cohort study. We measured maternal urine bisphenol and phthalate concentrations in first, second and third trimester of pregnancy, and lung function by spirometry and asthma by questionnaires at age 13 years. Multivariable linear and logistic regression models were applied.

**Results:** Maternal urine bisphenol and phthalate concentrations averaged during pregnancy were not associated with childhood lung function or asthma. Associations of maternal urine bisphenol and phthalate concentrations in specific trimesters with respiratory outcomes showed that one interquartile range increase in the natural log transformed maternal urine mono-isobutyl phthalate concentration in second trimester was associated with a higher FEV1/FVC, but not with asthma, accounting for confounders and multiple-testing correction. Although there were associations of higher second trimester bisphenol S with a lower FVC and FEV1 in boys and girls, and of higher first trimester bisphenol S with a decreased risk of asthma in boys and an increased risk of asthma in girls, these results did not remain significant after correction for multiple testing. results were not modified by maternal history of asthma or atopy.

**Conclusions:** Maternal urine bisphenol and phthalate concentrations averaged or in specific trimesters during pregnancy were not strongly associated with childhood lung function and asthma at age 13 years. BPS, as a BPA substitute, tended to be associated with impaired lung function and altered risk of asthma, partly sex-dependent, but its strength was limited by a relatively low detection rate and should be queried in contemporary cohorts.

**Conflicts of interest to disclose:** We declare no competing interests