

#ISEE2021

33rd Annual Conference of the International Society for Environmental Epidemiology

Promoting Environmental
Health and Equity in
a Shifting Climate



August 23-26, 2021

Abstracts'
E-Book



Local Academic Host:
Columbia University
Mailman School of Public
Health, New York, US





ABSTRACT E-BOOK

P-061

Chemical exposures » Heavy metals

Cadmium exposure and risk of prediabetes and diabetes: A systematic review and dose-response meta-analysis

Tommaso Filippini¹, Lauren Anne Wise², Marco Vinceti³

¹Environmental, Genetic and Nutritional Epidemiology Research Center (CREAGEN), Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy;

²Department of Epidemiology, Boston University School of Public Health, Boston, USA

³Environmental, Genetic and Nutritional Epidemiology Research Center (CREAGEN), Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy and Department of Epidemiology, Boston University School of Public Health, Boston, USA

BACKGROUND AND AIM: Elevated cadmium exposure has been associated with altered glucose metabolism, albeit the shape of such relation is still debated. We aimed at investigating the shape of the relation between cadmium exposure and type 2 diabetes and prediabetes.

METHODS: We performed a systematic review with meta-analysis on the relation between biomarkers of cadmium exposure and disease risk. After performing an online literature search through March 15, 2021, we identified 34 eligible studies with cohort, cross-sectional and case-control design.

RESULTS: In the meta-analysis comparing highest-versus-lowest cadmium exposure, there was an increased type 2 diabetes risk, with summary risk ratios (RRs) of 1.30 (95% confidence interval (CI): 1.00-1.69), 1.22 (95% CI 1.00-1.50), and 1.47 (95% CI 1.01-2.13) for blood, urine, and toenail cadmium concentrations, respectively. Similarly, we found a higher prediabetes risk in subjects with higher both urine and blood cadmium concentrations with RRs of 1.41 (95% CI 1.15-1.73) and 1.38 (95% CI 1.16-1.63), respectively. In the dose-response meta-analysis, compared with no exposure, prediabetes risk increased up to approximately 2 µg Cd/g creatinine, above which it reached a plateau with RR of 1.40 (95% CI 1.12-1.76) at 2 µg Cd/g creatinine. We also detected a substantial linear positive association between diabetes risk and urinary cadmium, with RR of 1.30 (95% CI 0.92-1.84) at 2.0 µg Cd/g creatinine. Diabetes risk also appeared to increase with higher blood cadmium concentrations but only above 1 µg/L, with RR of 3.25 (95% CI 1.13-9.37) at 2 µg/L. Despite limited data, there was little indication of differences in association by study design (cohort vs. case-control or cross-sectional), method of cadmium assessment, or sex (male vs. female).

CONCLUSIONS: Overall, there was consistent evidence for a positive association between cadmium exposure and both prediabetes and diabetes risk.

Keywords: Heavy metals, Cardiovascular diseases, Endocrine disrupting chemicals, Environmental epidemiology, Toxicology