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Fish and shellfish are rich in essential nutrients, but are also a source of exposure to environmental contaminants. We aimed to investigate the effect of increased fish and mussel intake on mercury, arsenic, lead and cadmium blood concentrations. We randomly assigned 102 healthy men and women (all non-smokers) aged 48-76 years to an intervention group (n = 51) or a control group (n = 51). Intervention participants received a high amount of fish and mussels for 26 weeks (1 kg week(-1)). Controls received no intervention and were expected to eat less than 300 g of fish and mussels per week. Whole-blood concentrations of mercury, arsenic, lead and cadmium were determined using inductively coupled plasma-mass spectrometry. All available observations were included in linear multiple regression analysis to evaluate the effect of the intervention. The difference in mean change for intervention compared with control persons was 5.1 ng ml(-1) (95% confidence interval (CI) = 4.4, 5.8) for mercury, 7.1 ng ml(-1) (95% CI = 5.0, 9.2) for arsenic, and 2.6 ng ml(-1) (95% CI = 0.0, 5.2) for lead. For cadmium, the majority (65%) of the measured concentrations were below the limit of detection of 0.4 ng ml(-1), and the results are therefore not presented. In conclusion, whole-blood concentrations of mercury, arsenic and lead were significantly increased after 26 weeks intervention in this healthy, middle-aged population. The concentrations were not of health concern in this population, except for lead. For lead both the baseline and the post-intervention concentrations were high and exceeded the tolerable concentration levels.

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Contributors: Outzen, M., Tjønneland, A., Larsen, E. H., Hansen, M., Andersen, K. K., Christensen, J., Overvad, K., Olsen, A.
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