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This is the published version of a paper published in *International Journal of Circumpolar Health*.

Citation for the original published paper (version of record):

Bergdahl, I., Hallmans, G. (2013)

Human biobanks in research: recent studies of health effects of metals, and plans for persistent organic pollutants. Experiences and plans in northern Sweden.

International Journal of Circumpolar Health, 72(Supplement 1): 997-997

Access to the published version may require subscription.

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Human biobanks in research: recent studies of health effects of metals, and plans for persistent organic pollutants. Experiences and plans in northern Sweden

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The Northern Sweden Health and Disease Study (NSHDS) is a combination of 3 population-based studies that continuously collect human blood samples in Sweden's 2 northernmost counties and store them in biobanks for future research (1). These 2 counties belong to the Arctic region but are culturally quite similar to Western Europe. Sampling started in 1985 and over 100,000 individuals have been sampled at almost 200,000 occasions. These samples form a valuable resource in studies of those environmental pollutants that can be biomonitoring through blood samples, such as certain metals and persistent organic pollutants. For studies of environmental health, the most important designs are the nested case-control study with prospectively collected samples and studies of exposure time-trends.

Within the recently finished PHIME project (Public health impact of long-term, low-level mixed element exposure in susceptible population strata), several studies of health effects of metals have been made within NSHDS. Case-control studies have been performed on fractures (cadmium), uremia (cadmium, lead, mercury), diabetes (cadmium), stroke (mercury; 2) and acute myocardial infarction (mercury; 3). In addition, time-trends have been monitored (4), and risk-benefit analyses for acute myocardial infarction (methylmercury and n-3 fatty acids from fish; 5).

In the future, these biobank samples may be utilized, e.g., in studies of persistent organic pollutants (POPs) in relation to diabetes. For epidemiological purposes, an asset has been the possibility to use prospectively collected samples in environmental health studies. For the

future, an increasing number of individuals have left samples more than once, giving further possibilities. This increases the potential in studies where associations are evident, but with an unclear cause-effect relationship. Here, diabetes and POPs are issues that need such studies, being of great concern both in the circumpolar regions and in the rest of the world.

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