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# Meconium analysis using AAS for screening the intrauterine exposure to heavy metals in an ecological disaster region

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*Abstract.* To determine whether the heavy metal concentrations in meconium originating from an ecological disaster region ( Upper Silesia, PL) are significantly higher in comparison with samples from rural areas concentrations of lead, cadmium, zinc and copper were determined in two collections of 27 and 26 meconium samples using AAS. The mean concentrations (Std Dev) of metals in the exposed group were as follows: Pb 8.1(2.63) ng/g, Cd 7.9(2.49) ng/g, Cu 15.3(5.2) µg/g, Zn 67(20.6) µg/g; in the control group: Pb 4.7(1.44) ng/g, Cd 5.0(1.62) ng/g, Cu 15.2(5.34) µg/g, Zn 68(16.8) µg/g. Very significant statistically differences in mean concentrations of lead and cadmium between the populations were detected ( $p<<0.05$ ). No difference was shown in mean concentrations of copper and zinc between the groups.

Introduction.

One of the materials that seem to be very useful in determination the intrauterine exposure to heavy metals is meconium. The reasons are as follows:

- meconium is easy available
- it is present at the age when foetus is very sensitive to the negative influence of toxic elements
- it is located on the foetal side of the presumable ' placental barrier'
- as method of screening the intrauterine exposure to drugs and smoking proved to be superior when comparing with urine analysis[1].

The review of literature revealed no case of using meconium for screening the intrauterine exposure to heavy metals. Presently placenta[2,3], umbilical cord blood and urine are the usual samples on which neonatal heavy metal burden is performed. Comparing with urine meconium is much easier to collect and reflects a longer period of exposure in utero[1] than both urine and umbilical cord blood do. This is why we chosen in the present study meconium samples as the material for screening the intrauterine exposure to heavy metals in ecologically endangered region that Upper Silesia is.

Material and methods.

The exposed material was the collection of 27 meconium samples from appropriate for gestional age, term healthy newborns, aged 1 day, born in Świętochłowice, Upper Silesia, PL, who gave meconium on the first day of life and whose mothers were neither exposed to heavy metals by occupation nor were ill or taking medications during pregnancy. The 26 samples of the control group met all the above criteria but lived in Lubelskie (clean rural area ).

The samples (approx. 15g each)were frozen and stored at -20°C in acid washed polyethylene tubes. The mineralisation of the samples was carried out with the



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