Read and evaluate the article *Neuromotor functions in Inuit preschool children exposed to Pb, PCBs, and Hg*, by Despres et al.  After reading the article, please answer the following questions.

1. **Give a PICO (Population, Intervention/Exposure, Comparison, Outcome) for the study. What are the main research questions addressed?**

The population was 110 preschool Iniut children (4-6 years old) from Cananda. The exposure was perinatal exposure to mercury, polychlorinated bisphenyls, and lead. There was no control group, as this was an observational study. The outcome measures were the levels of the three compounds mentioned above, in both cord blood (at birth) and serum, at the time of testing. Gross motor, fine motor, and neurological exams were also part of the outcome measure. Additionally, they examined reported intake of protective nutrients, including Ω-3 fatty acids and selenium.

The main research questions addressed were:

-In Inuit preschoolers, are cord blood levels (at birth) and serum levels (at 4-6 years old) of several known neurotoxins correlated with neurological functioning as measured by neurological status, reaction time, alternating and pointing arm movements, and balance?

-Is intake of nutrients like Ω-3 fatty acids and selenium protective against nu

1. **Why is it important to compare actual participants in the study to excluded subjects and eligible non-participants? How did the authors do this?**

This study was run as a follow-up to a previous study, the Cord Blood Monitoring Program. The women who participated in that study were invited to participate in this study. Inclusion criteria included child aged 4-6, biological mother as caretaker, full-term pregnancy, birth weight > 2500g, no know neurological or development disorder, and no severe chronic disease. Therefore, they were selecting for only very healthy children who were a healthy birth weight and were living with their biological mother (not entirely generalizable). They did an analysis of the participants in the Cord Blood Monitoring Program who joined this study, and those who refused. The found that there were no significant differences in age of mother, parity, children’s weight at birth, and several other measures between the two groups. They then suggest that this means that the “sample was representative of the population” because the people agreeing to participate and those refusing were similar, at least in the traits mentioned above.

1. **In Table 5, the association between Child Pb and Reaction Time is *β*=0 .24,  
   with *p* < 0.01.  Explain what this means, in terms of the relationship between a child's blood lead concentration and tested reaction time.**

Standardized ***β*** is a way of predicting how much the standard deviation of the outcome variable, reaction time, will change if the standard deviation of the predictor variable, child lead, changes by 1. In this case, if the standard deviation of child lead increases by a value of 1, the standard deviation of reaction time will increase by a value of 0.24. The p-value is <0.01, suggesting that the relationship between the standard deviation of child lead and the standard deviation of reaction time is significant.

1. **In this study, six principal predictor variables were tested. What were they? For each one, list the neuromotor outcomes for which it was found to be predictive.  Is there stronger evidence for an effect of prenatal concentration of toxicants, or of concentrations at the time of testing?**

The six predictor variables, with associated neuromotor outcomes were:

* Prenatal exposure to lead, mercury, and PCBs
  + Transverse sway in balance conditions
* Prenatal selenium
* Prenatal Ω-3 fatty acids
* Postnatal lead exposure
  + Reaction time (increased)
  + Sagittal sway (increased)
  + Sway velocity (increased)
  + Sway velocity in tandem position (increased)
  + Alternations in morphology of alternating movements (increased)
  + Movement irregularity (increased)
  + Less coherence in movement (increased)
  + Higher action tremor amplitude
* Postnatal PCB exposure
* Postnatal mercury exposure
  + Higher action tremor amplitude

There is stronger evidence for toxicants in the blood at time of testing as a predictor of neurological outcomes, than of toxicants in cord blood as predictor of neurological outcomes.