Chandra et al, 1983

Guidelines/Criteria	
Reference:	Chandra SV, Murthy RC, Saxena DK, Lal B. 1983. Effects of pre- and postnatal combined exposure to Pb and Mn on brain development in rats. Ind Health 21(4):273-279.
***In vivo* Study Type** Route of Administration Species & age of animals	Brain development study IP injection of the dams Female adult rats (not further specified)
Study Duration	Gestation and up to 22 days postnatal
Type of Mixture Binary >2 components Similar acting or dissimilar What Mode of Action was investigated?	 Yes No Not known Nothing specific
Parameters/End points Measured Target organs/Critical effects Pharmacological changes or adverse effects	 Body and brain weight, DNA, RNA and protein content of brain - all for pups only. Adverse
Individual Components Characterisation of individual compounds Name, exact chemical name, CAS no. Were dose responses established for individual components? Were no effect levels established? Were doses below the NO(A)ELs investigated?	 Lead and manganese, presumably as salts though this is not stated. N/A No No
Mixtures Investigated Number of dose levels How does the mixture make-up compare to individual components? (e.g. low dose) equivalents used?) No. of technical replicates per exposure condition (*in vitro*) No. of animals per dose group (*in vivo*)	 One, 5mg/kg Pb and 6 mg/kg Mn. Dosing was either during gestation, or lactation, or both. Not known 10 dams
Observations/Findings	No NOEL was established for Pb alone for the group dosed during gestation only and for the group dosed during gestation and lactation. Therefore only the groups dosed solely during lactation are relevant for our purpose - in these there were no effects of Pb or Mn dosed singly, but the mixture caused a 25% decrease in body weight, with no effects on other endpoints.
Overall opinion (e.g. sufficient numbers of groups investigated, group sizes adequate, observations reproducible, low dose levels used investigated)	 The main findings seem robust, but no dose-responses so of very limited value.