

Comments on: EPA's Reanalysis of Key Issues Related to Dioxin Toxicity and Response to NAS Comments (External Review Draft)

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Imagine the result



Oral Cancer Slope Factor Ignores Other Dioxin- Like Congeners

- Proposed oral cancer slope factor (OSF) based on estimated TCDD exposure in workers at eight US chemical manufacturing facilities
- All other dioxin & furan congeners ignored
- Dose was underestimated
- Cancer slope factor was *overestimated*
- EPA policy requires that all dioxin-like congeners be included in TCDD-TEQ for all risk assessments
- Consequently, cancer slope factor must consider all dioxin-like congeners

Proposed OSF Overpredicts Observed Cancer Mortality

- EPA has not validated the proposed OSF
- EPA estimates that population exposures increased from 1930s to mid-1960s and then declined
- Assume 1930-2000 average US intake of 8 pg/kg-day
- Using proposed OSF, predicted population risk is 8×10^{-3}
- Only sites statistically significantly elevated in Cheng et al. (2006) were larynx and bladder
- OSF predicts 27,000 larynx + bladder cancers/year
- Actual observed number is 16,000/year
- Known risk factors (smoking, alcohol, etc.) clearly account for many, if not most, observed cases
- Preliminary screening validation shows that proposed OSF is not realistic

The Proposed RfD From Mocarelli et al. (2008) is Flawed

- RfD assumes TCDD is solely responsible for effects despite the presence of other dioxin-like compounds
- RfD is inaccurate (too stringent)
- Observed effect is not adverse
 - Decreased sperm concentrations were within normal ranges
- No tests of statistical significance performed comparing young boys and controls (variability was high within groups)
- Age groups arbitrary (1-9 vs 10-17)
- Puberty defined as 10 years old
- Comparison group not defined (“healthy blood donors from nearby area”)
- Effect showed no dose-response

The Proposed RfD From Baccarelli et al. (2008) is Flawed

- RfD is inaccurate because RfD assumes TCDD is solely responsible for effects
- Observed effect is not adverse
 - TSH at 5 -10 $\mu\text{U}/\text{ml}$ is normal for 3-day-old neonates
 - TSH at 5 – 20 $\mu\text{U}/\text{ml}$ is not diagnostic of disease
 - TSH at 10 $\mu\text{U}/\text{ml}$ was used by authors to screen neonates, not 5 $\mu\text{U}/\text{ml}$
- Iodine status of study population unknown
- Status of PBDE, PBB and other confounders unknown
- TSH measurements have many confounders, are highly uncertain, and are highly variable
 - T4 and confirmatory TSH should have been analyzed

Proposed RfD Over-predicts Observed Effects on Thyroid and Male Reproduction

- EPA has not validated the proposed RfD
- Population exposures exceeded the RfD during the 1960s – 1990s by 10-fold or more
- RfD predicts that increased TSH and decreased sperm conc. should have been observed in the entire population with decreasing effects in recent years
- No evidence of increased newborn TSH levels from 30s to 60s with recent decreases
- Incidentally, congenital hypothyroidism rising from 70s to present as dioxin/furan intakes have dramatically decreased
- No credible evidence of decreased sperm concentrations from 30s to 60s with recent increases as dioxin/furan intakes have decreased

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A scenic landscape at sunset. The sky is filled with soft, golden light and scattered clouds. In the foreground, there are rolling green hills with patches of blue-green vegetation. A calm lake reflects the sunset colors. In the distance, two people are standing on a ridge, looking out over the landscape.

Imagine the result