

# **Taking Action to Stop Pollution Harm to Children and Future Generations**

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## **Introduction**

Given the shortage of available organs for transplant, and the millions of “street children” in nations like Brazil, the World Health Organization estimates that organ trafficking accounts for up to 10 percent of all organ transplants. Part of a trillion-dollar annual global-economic output in illicit trade, organ trafficking annually causes thousands of murders---murders especially of children---among many of those whose organs are harvested for resale (1).

No ethical person would murder a child in order to steal and then sell her organs. However, all of us today harm children and future generations in deadly ways, and we appear to be doing little to stop our harm. That is, we all use, release, or benefit from epigenetically toxic environmental pollutants, such as endocrine disruptors, metals, ionizing radiation, and some pesticides. We cause developmental toxicity (DT) in children and future generations

This paper (i) uses the example of epigenetically toxic environmental pollutants and DT to explain how we cause severe pollution harms to children and future generations. It (ii) argues that no major ethical theory can justify allowing avoidable epigenetically toxic environmental pollutants, and (iii) shows that we have justice-based duties to help stop avoidable epigenetically toxic environmental pollutants exposures. We have such duties because, to varying degrees, we all help cause epigenetically toxic environmental pollutants and we profit from them. Finally, the paper (iv) answers objections to (iii).

### **Developmental Toxicity**

For developmentally, pre-natally and post-natally exposed children, epigenetically toxic environmental pollutants often cause heritable gene-expression changes. That is, these pollutants cause DT that increases later-life disease, dysfunction, and death, including asthma/allergy, cancer, cardiovascular disease, depression, diabetes, hypertension, immune and autoimmune diseases, infertility, neuro-developmental and neurodegenerative diseases, obesity, osteoporosis, precocious puberty, and schizophrenia.

We cause this DT harm because each person's phenotype P (observable traits, behaviour, disease, development) results from the expression of her genotype G (genetic code/DNA), environmental influences E, and interaction between the two. That is,  $G + E + GE \text{ interactions} \rightarrow P$ . However, in critical pre- and post-natal developmental periods,

pollutants often can interfere with genomic saturation of DNA methylation and cause long-lasting epigenetic changes. These changes can include heritable genome and gene-expression modifications that involve no change in DNA or nucleotide sequence but cause greater susceptibility to disease, dysfunction, and death, e.g., cancer and cognitive or social-learning deficits (2). In fact, many diseases/dysfunctions “have increased substantially” in the last 40 years”(2); often can be “transgenerationally transmitted” (3); result at least partly from developmental changes caused by pre- and post-natal epigenetically toxic environmental pollutants ---like phthalates, flame retardants, and some particulate matter---but may be latent for months to decades (2).

Although epigenetically toxic environmental pollutants involve some scientific uncertainty, they pose troubling harms to innocent children and future generations. Children also have only “one chance” to “develop a brain” (4), and they have not consented to epigenetically toxic environmental pollutants. Should we allow weak or no regulation of epigenetically toxic environmental pollutants? Should we allow our own use and release of epigenetically toxic environmental pollutants products and pollutants?

### **Dominant Ethical Theories Disallow Avoidable DT**

Any one of at least four ethical codes (Aristotelian virtue theory, Thomistic natural-law theory, Millian utilitarianism, Rawlsian egalitarianism) is alone sufficient to show that it is prima-facie unethical to allow avoidable DT. They show that anyone who believes that it is ethical to allow avoidable DT must provide ultima-facie arguments to the contrary (5). For Aristotelians, for example, the purpose/goal/ meaning/telos of life is human flourishing or eudaimonia, the desired end of all human actions, achieved by having a virtuous character (6). Because avoidable DT harms this telos, because DT increases disease/death/injury and epigenomic and transgenerational harms (2), consistent Aristotelians would not allow it. Also, in the Aristotelian world, where the virtue of courage is key to flourishing, those who lack the courage to protect others---innocent children---will themselves not attain eudaimonia. Therefore those lacking the courage---to help stop avoidable DT---behave unethically, apart from the indefensible harm they allow to children.

But might allowing avoidable DT promote overall economic welfare, thus human flourishing? Because Aristotelians believe that cost-benefit analysis fails to capture eudaimonia, anyone who wishes to show that ethics somehow allows avoidable DT must show that epigenetically toxic environmental pollutants promote eudaimonia. Yet, given avoidable epigenetically toxic environmental pollutant-harms, like DT, allowing

epigenetically toxic environmental pollutants arguably would not lead to greater virtue and flourishing (6).

### **Natural-Law Ethics and Alleged “Free-Market” Objections**

Followers of Thomas Aquinas’ natural-law ethics likewise must reject avoidable DT because universal law--written on human hearts, discoverable by human reason--binds people and governments to act in accord with this law, especially its fundamental tenet to preserve human life and happiness (7). Because avoidable DT threatens life and happiness, consistent natural-law theorists cannot allow it.

What if alleged “free-market environmentalists” claim that allowing epigenetically toxic environmental pollutants---that cause avoidable DT---contributes to preserving human life? Harvard attorney Cass Sunstein argues that (a) monies spent on regulations “produce less employment and more poverty,” that (b) “wealth buys longevity,” and therefore that (c) health-related regulations cost money, “increase risk,” thus kill people (8). However, Sunstein errs, committing three logical fallacies of false cause in premises (a-b) above. Premise (a) falsely assumes that health-related regulations reduce employment. Yet health-related regulations are neither necessary nor sufficient for reduced overall employment.

Instead, health-related regulations typically increase overall employment or shift it from one sector/industry to another, with no net job loss. For instance, workers often move from old and dirty to new and clean technologies, with no overall job loss. Why? Many clean technologies (like solar and wind energy) are more labor intensive, per kilowatt of electricity. Cleaner technologies also often save lives and therefore jobs (8, 9).

In addition, Sunstein's premise (a) errs in assuming industrial profits are always spent to increase employment---an assumption falsified by the last half-century of US economic history. Often industrial profits, especially in the US, are used merely to increase executive salaries and shareholder profits, not to help workers. Similarly, Sunstein's premise (b), that "wealth buys longevity," also errs because mortality is very strongly associated with societal income-inequality, not per-capita/median income (10).

Sunstein likewise errs in begging the question that cost-benefit analysis is the sole test for regulations. A simple counterexample shows it is not: Law requires expensive trials and possible prosecution, incarceration, or death for accused murderers. Yet, criminologists agree these requirements are rarely cost-effective. Why not? Most murderers are not serial offenders. Thus they pose no future threat to society. Yet, society tries them because justice requires it. This case shows that justice often trumps alleged cost-effectiveness and "free-market" calculations. Thus, free-market objections offer a wolf's argument ("might makes

right”) in sheep’s clothing (market reasoning). Also, most free-market economists deny that regulations kill people (11). If not, “free-market” objections, defending epigenetically toxic environmental pollutants, fail logically, scientifically, and ethically.

Could utilitarians consistently defend allowing avoidable epigenetically toxic environmental pollutants? No; epigenetically toxic environmental pollutants cause death and disease, and people’s anxiety about death and disease would harm the greater good. Why? Harms to minorities, like children, hurt the majority. This why utilitarian John Stuart Mill rejected “the tyranny of the majority” (12). Yet, do DT-caused societal inequities, resulting from epigenetically toxic environmental pollutants, reduce overall welfare? Do health-related regulations increase unemployment and death? As previous responses reveal, alleged “free-market” objections fail to justify allowing avoidable epigenetically toxic environmental pollutants; the premises of such objections are false, and their inferences are invalid.

What would egalitarians, like John Rawls (13), say about epigenetically toxic environmental pollutants? Rawls believes equal opportunity and liberty are the primary ethical goals. He argues that any societal inequalities should be arranged to benefit the least-well-off and most vulnerable people. Obviously therefore, Rawlsians would reject avoidable DT because it risks liberty and equal opportunity, especially among children. “Free-market”

objections also fail against Rawls because they give priority to alleged economic benefits, not equal opportunity, as Rawls does. Thus, no major ethics codes allow people to cause avoidable, epigenetically toxic environmental pollutants (14).

### **We Cause DT Thus Have Duties to Stop It**

Other justice-based reasons also show we should not allow avoidable, epigenetically toxic environmental pollutants. Why not? We help cause DT harm to children, and we benefit from DT because we all contribute to air pollution, and we save money---at children's expense---by not paying to control air pollution. For instance, we purchase and use products containing bisphenol A, phthalates, pesticides, perfluoro-octane compounds, polybrominated diphenyl ethers, etc.---all of which are known to cause DT (1,14,15). Similarly, at least in Europe and the US, fossil-fueled vehicles cause DT because they cause about half of all ozone and particulate matter (PM). Neither has a safe dose; both especially harm children far more than adults (14, 15). Yet PM alone, half from our cars, causes at least \$2 billion per year in asthma harms to US children, apart from developmental harms; PM helped double US pediatric-asthma rates over the last 10 years (14). Yet, we who drive fossil-fueled vehicles, we who cause half of this PM, never compensate our victims. Nor do those of us, who benefit from coal-generated electricity, compensate the innocent people, especially children,

who are harmed by coal-plant PM and who experience neuro/cognitive DT that is caused by mercury emissions from coal plants.

Apart from climate-related and other-pollutant harms, coal-plant mercury pollution alone causes IQ losses, therefore resulting income losses, in children. US newborns lose \$9 billion per year in IQ and discounted-lifetime-earnings from coal-plant-mercury pollution (16). Yet we who benefit from coal-generated electricity---we who save money by not forcing mercury controls on coal plants---never compensate those who are harmed by this pollution.

Nor do we, who eat pesticide-laden food, compensate the babies who lose IQ points and income because of pesticide pollution. Just from organophosphate-pesticide exposures, young US children lose millions of IQ points each year that cause \$61 billion per year in discounted-lifetime-earnings losses (14). They lose IQ points and income simply because we want cheap, pesticide-laden food.

Similar arguments, about how we citizens and consumers never compensate for all the DT harms we cause, hold for our uses of waste incinerators, cleaning products, etc. (14,15). We benefit, we save money, by helping cause DT. Therefore we are ethically obligated to help stop DT.

## **Objections and Solutions**

Of course, many other arguments tell why we have justice-based duties to help stop DT---and how polluters' can use invalid science to avoid regulations. Besides the objections discussed earlier, there also are many other objections to answer---and many DT solutions that each of us can personally and professionally implement, in order to help protect children and future generations. All of these solutions and arguments are discussed in detail elsewhere (14,15).

These answers to objections---these reasons that we must help stop avoidable DT----come down to one thing: The “natural lottery of life” gives us philosophers partly-unearned and unfair IQ, genetic, upbringing, and income advantages over most other people, especially children (13). To compensate for our unearned advantages in life, we can take action on DT. We can be the light in many children's darkness.

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