Incineration versus the Alternatives

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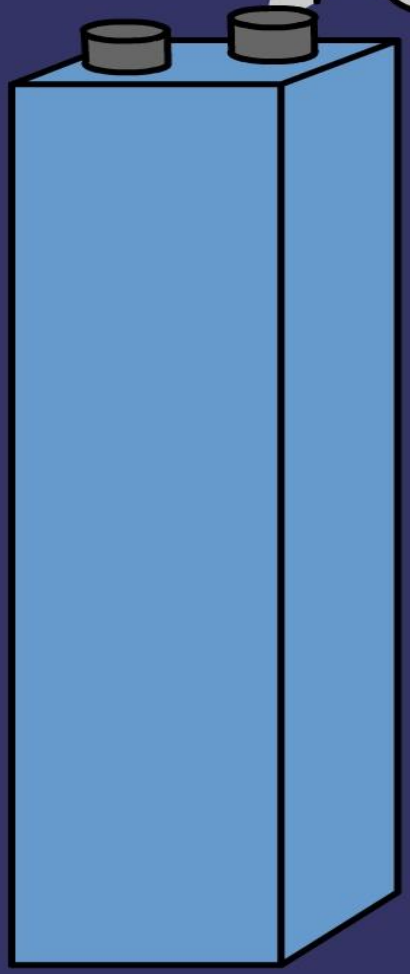
Oxfordshire, October 8, 2009

OUTLINE

- 1. Waste and the Big Picture
- 2. The arguments against incineration
- 3. The Zero Waste 2020 strategy
- 4. The Key Step Forward
- 5. Zero Waste Initiatives Around the World
- 6. Back to the Big Picture

7. Incinerators put many highly toxic and persistent substances into the air

AIR EMISSIONS



- **CO2 + H2O**
- **ACID GASES:**
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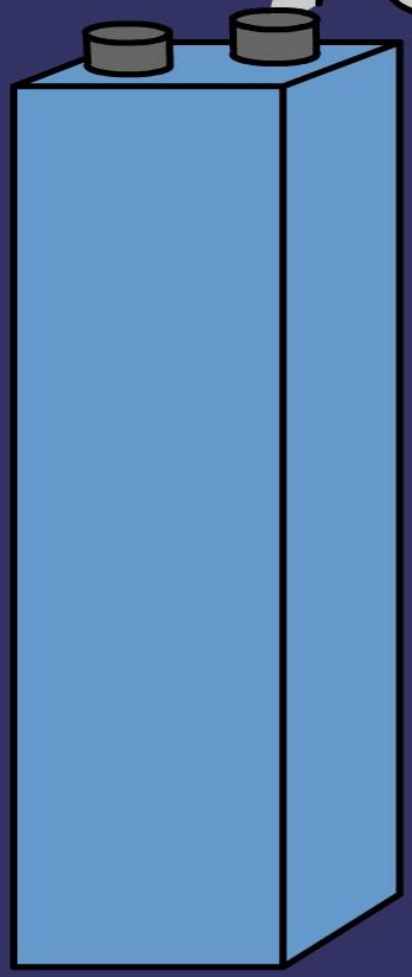

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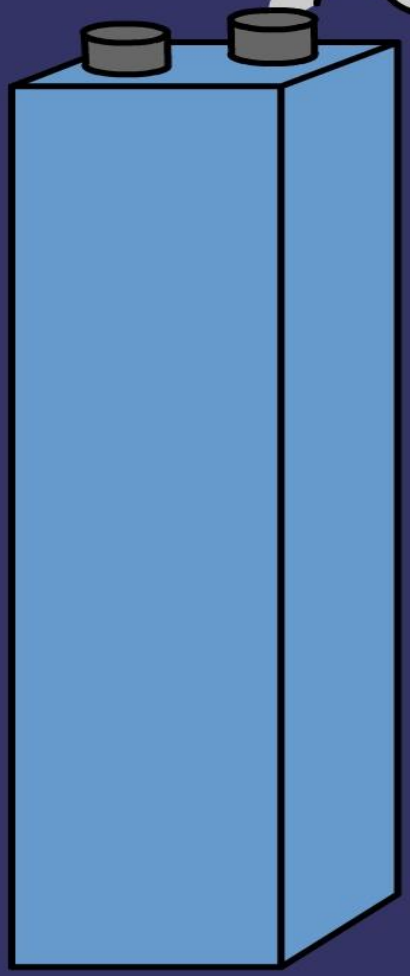

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  PCDFs (FURANS)
  PCB's
  ETC

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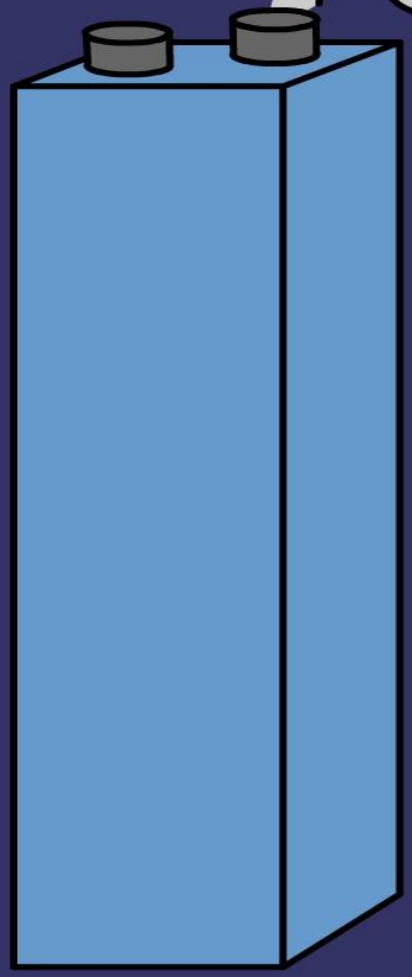

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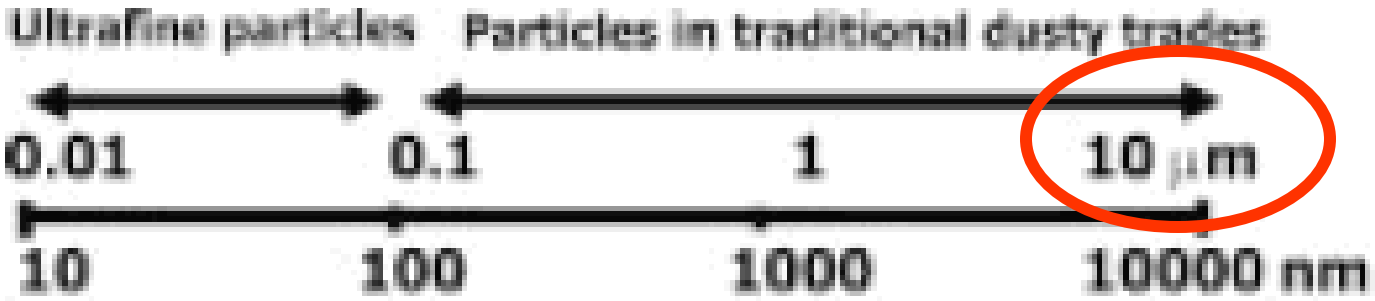


Size of Particle regulated in incinerator emissions

NANOPARTICLES

Figure 3 Relative size of ultrafine particles compared with particles in traditional dusty trades.

Review

Origin and Health Impacts of Emissions of Toxic By-Products and Fine Particles from Combustion and Thermal Treatment of Hazardous Wastes and Materials

Stephania A. Cormier,[1] Slawo Lomnicki,[2] Wayne Backes,[3] and Barry Dellinger[2]

[1]Department of Biological Science, and [2]Department of Chemistry, Louisiana State University, Baton Rouge, Louisiana, USA; [3]Department of Pharmacology, Louisiana State University Health Sciences Center, Baton Rouge, Louisiana, USA

VOLUME 114 | NUMBER 6 | June 2006 • Environmental Health Perspectives

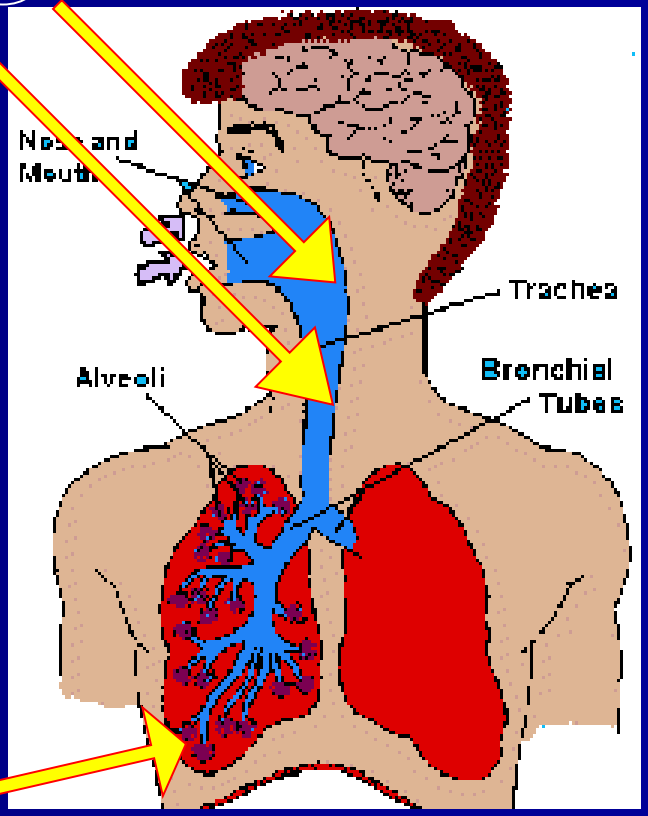
Incineration and nanoparticles

- Nanoparticles are not efficiently captured by air pollution control devices
- Travel long distances
- Remain suspended for long periods of time
- Penetrate deep into the lungs

•MALATTIE RESPIRATORIE…

- Malattie allergiche
- Asma bronchiale
- Bronchiti acute e croniche
- Enfisema polmonare
- Tumori polmonari e dell’apparato respiratorio in generale

PM 10



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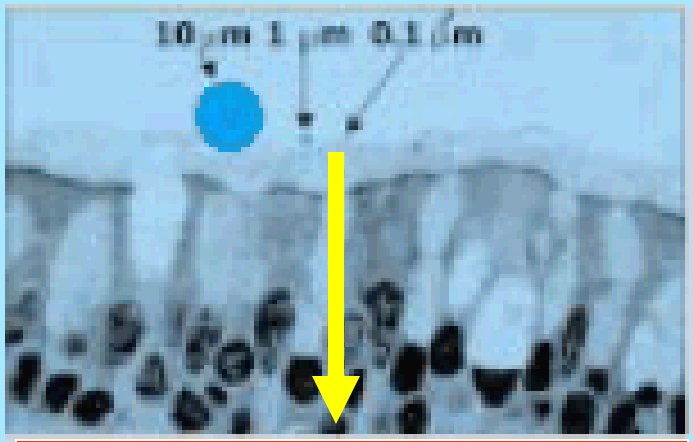


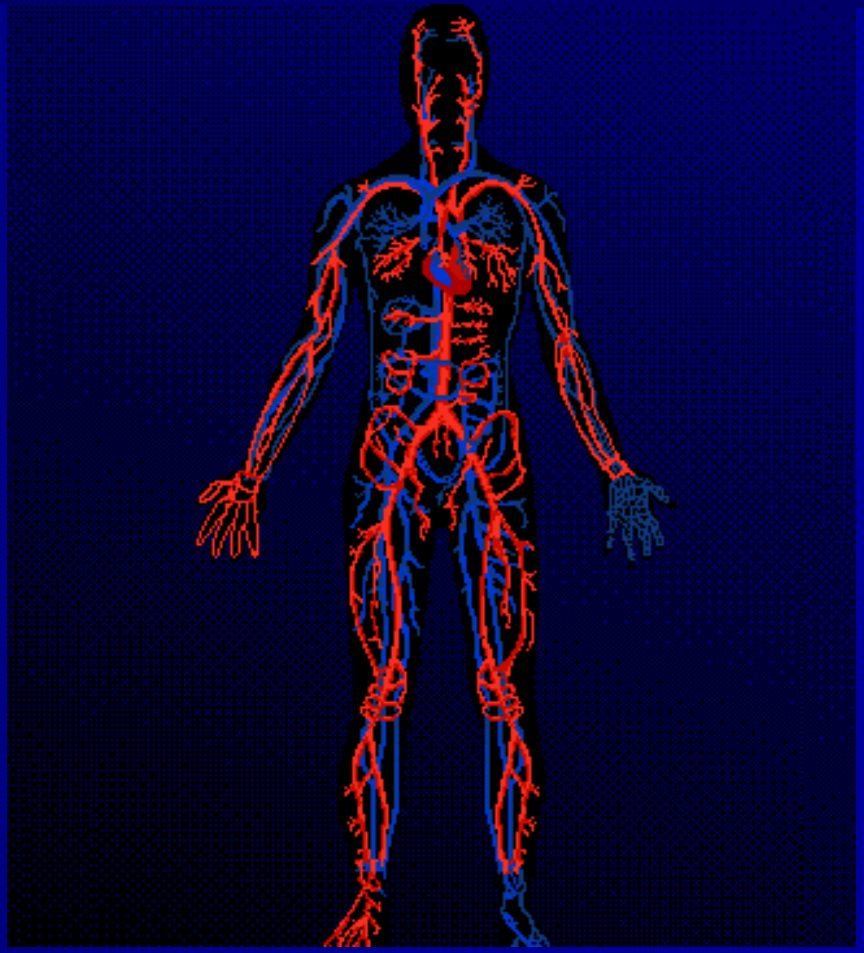
BLOOD

Nano particles are so small they can easily cross the lung membrane

Figure 1 Relation between ultrafine particles and cellular structures in the lung. Idealised particles of 10, 1, and 0.1 μm are shown compared with a bronchial epithelium; note that the top end of the range of ultrafine particles (0.1 μm, 100 nm) is not really visible. On the right are shown the same three particles relative to cilia.

Nano Pathology

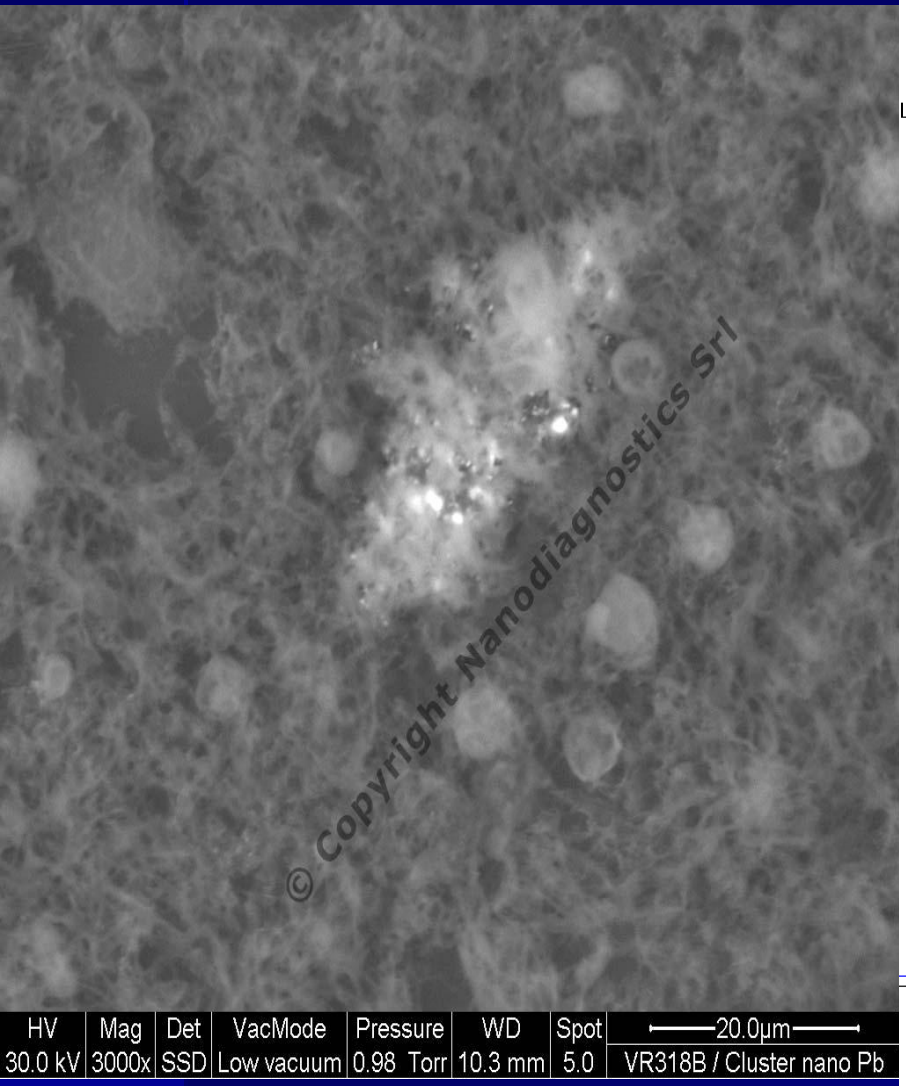
- Once nanoparticles have entered the bloodstream they can easily cross the membranes of every tissue in the body.

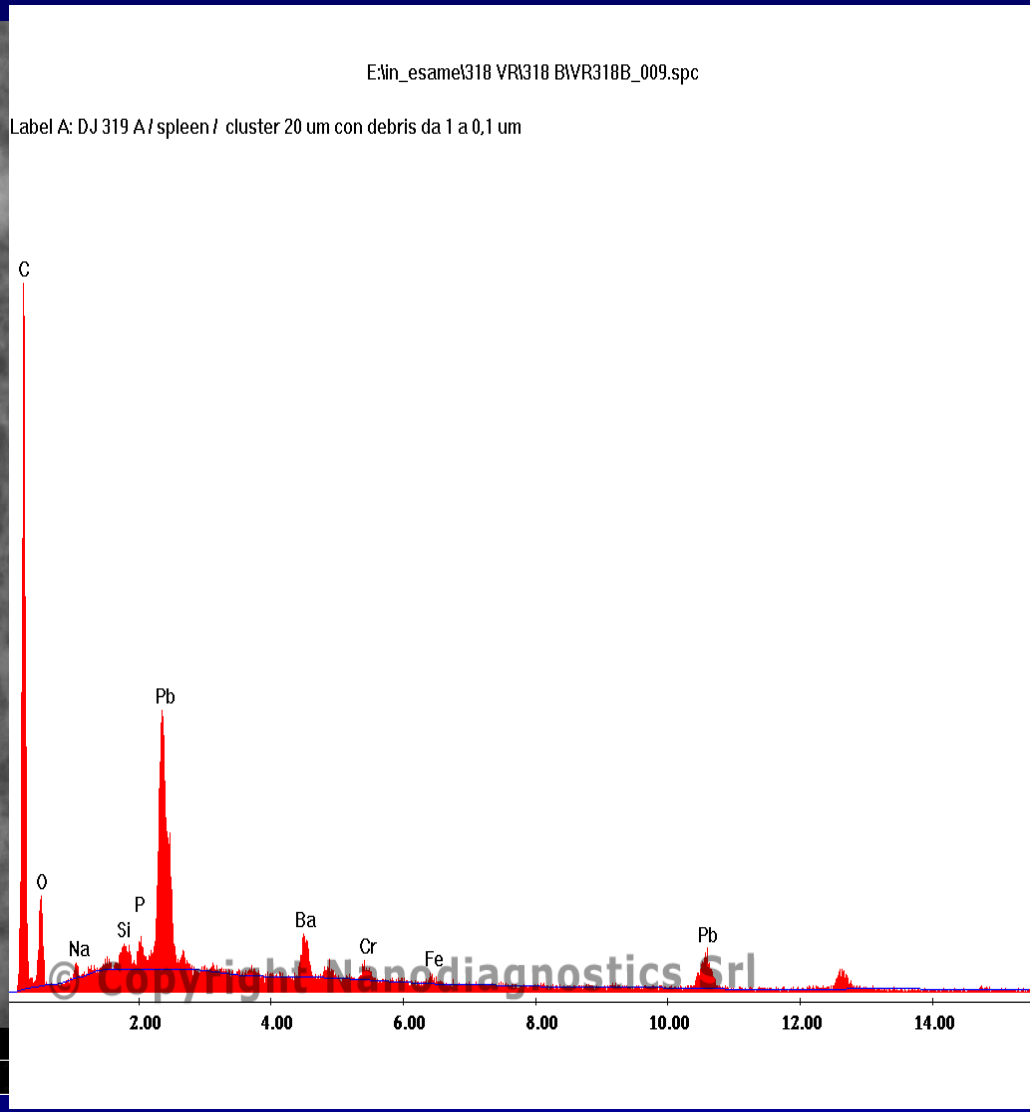


Nano Pathology

- They can even cross the blood brain barrier

Aggregati di Piombo, Bario, Cromo, Ferro **e** Silicio **in** Cervello**.**





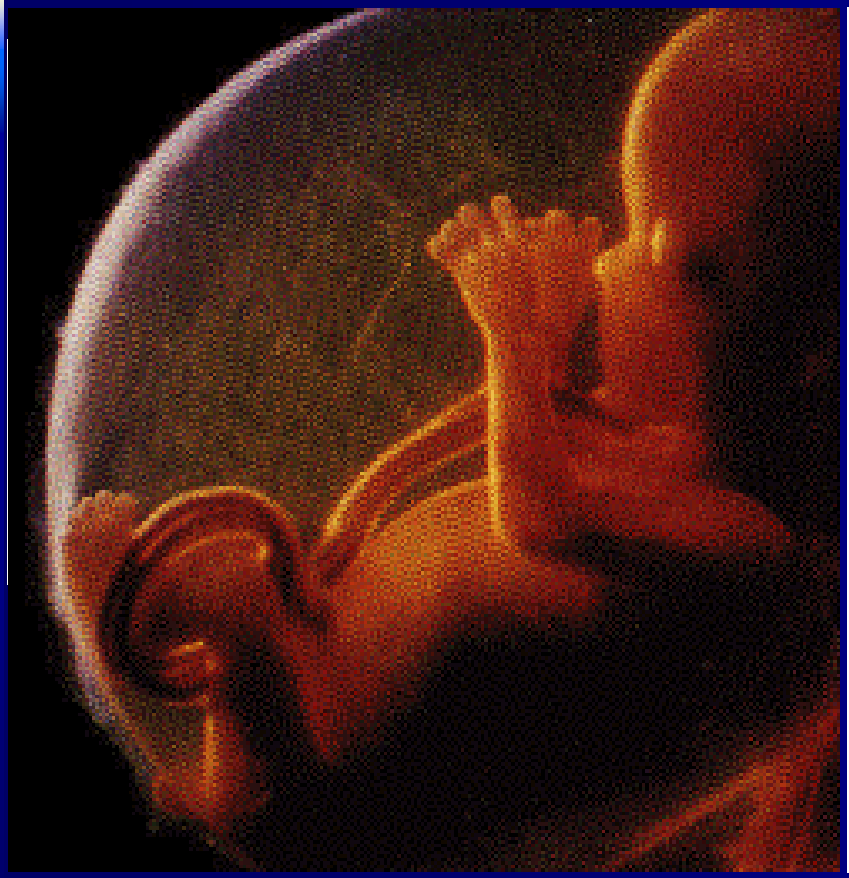
www.stefanomontanari.net

Dioxins and Incineration (more detailed ppt available)

Dioxins - major concerns

- **Dioxins accumulate in animal fat.**
- **One liter of cows' milk gives the same dose of dioxin as breathing air next to the cows for EIGHT MONTHS (Connett and Webster, 1987).**
- **Dioxins steadily accumulate in human body fat.**
- **The man cannot get rid of them BUT A woman can…**
- **…by having a baby!**

Dioxins: the highest dose goes to the fetus



In nine months much of the dioxin which has accumulated in the mother's fat for 20-30 years goes to the fetus

Dioxins can disrupt fetal and infant development

- Dioxins act like fat soluble hormones
- Disrupt at least 6 different hormonal systems:
- male and female sex hormones;
- thyroid hormones;
- insulin; gastrin and gluocorticoid.

Dioxins interfere with fetal and infant development

- **Linda S. Birnbaum (**Health Effects Research Laboratory, US EPA) Developmental Effects of Dioxins *Environmental Health Perspectives*, 103: 89-94, 1995

Our Stolen Future

How Man-made Chemicals are Threatening our Fertility, Intelligence and Survival

Theo Colborn
John Peterson Myers
Dianne Dumanoski
1994

Institute of Medicine, 2003

Dioxins and Dioxin-like Compounds in the Food Supply

Strategies to Decrease Exposure

July 1, 2003

Institute of Medicine, 2003

- **Fetuses and breastfeeding infants may be at particular risk** from exposure to dioxin like compounds (DLCs) due to their potential to cause adverse neurodevelopmental, neurobehavioral, and immune system effects in developing systems…

Institute of Medicine, 2003

- …The committee recommends that the government place a high public health priority on reducing DLC intakes by girls and young women in the years well before pregnancy is likely to occur.

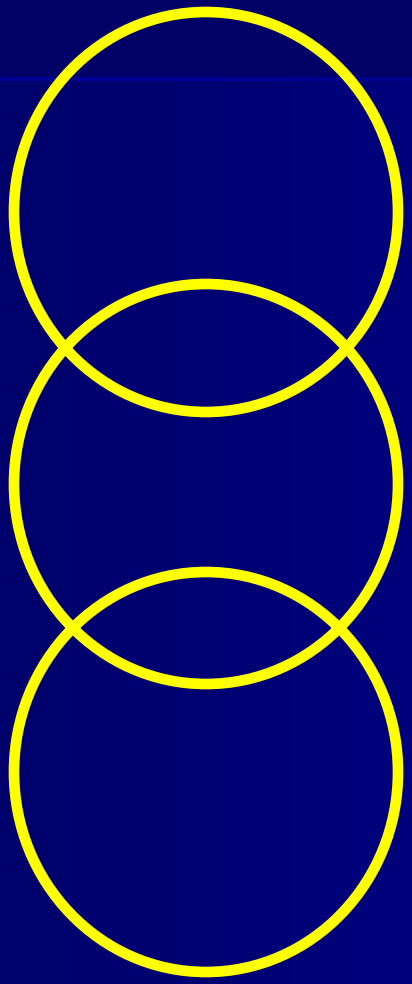
- (by) Substituting low-fat or skim milk, for whole milk, (and)… foods lower in animal fat…

Dioxins & Incineration (conclusions)

- We have too much dioxin in our food
- We have too much dioxin in our bodies
- We have too much dioxin in our babies
- We shouldn't be putting any more dioxin into the environment if we can possibly avoid doing so
- Incineration is an AVOIDABLE source of dioxin

8. Incineration is poorly and unscientifically monitored

YOU NEED THREE THINGS TO PROTECT THE PUBLIC FROM TOXIC EMISSIONS.



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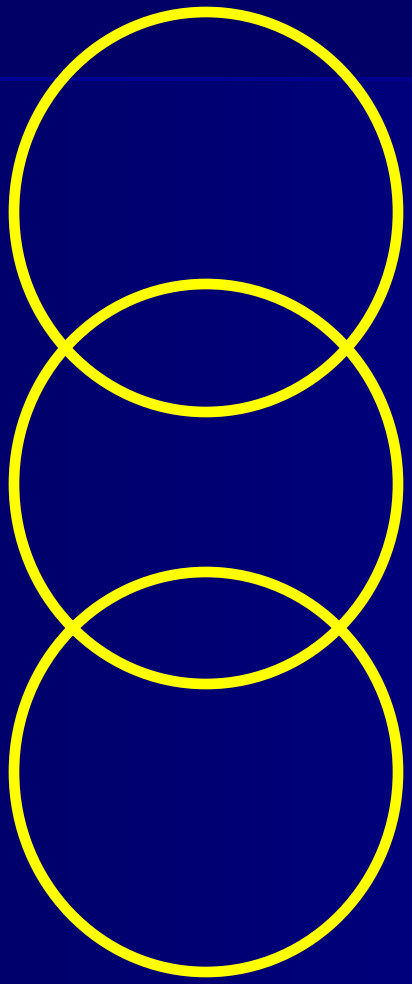

STRONG REGULATIONS

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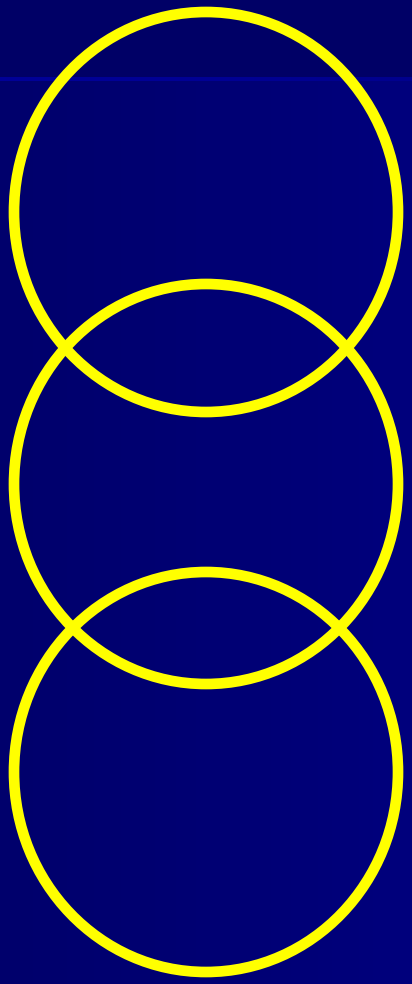

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ADEQUATE MONITORING

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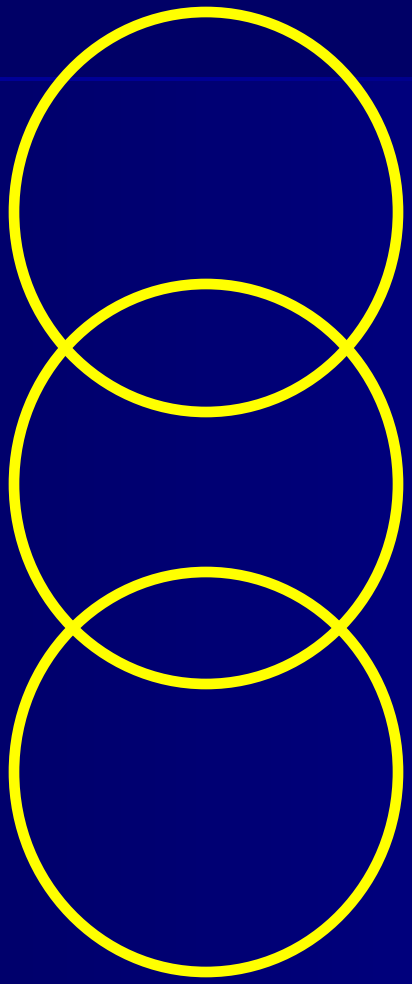

STRONG REGULATIONS

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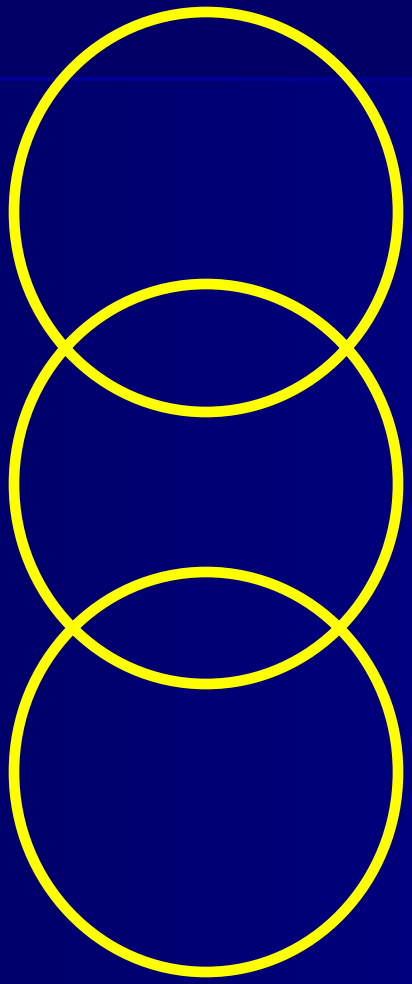

STRONG REGULATIONS

ADEQUATE MONITORING

TOUGH ENFORCEMENT

IF ANY LINK IS WEAK THE PUBLIC IS NOT PROTECTED

Dioxin monitoring in the UK is totally inadequate

- Incinerator only measured twice a year - usually with a month's notice to the company
- Data collected under ideal conditions
- 3 x 6 hour tests used
- 36 hours of IDEAL data being used to extrapolate to 8000 hours of REAL operation
- Worse still - they use an AVERAGE instead of a 95% upper confidence level

9. Incineration is extremely unpopular with the public

- In the US over 300 incinerator proposals defeated since 1985
- US has not permitted a new trash incinerator since 1995
- There has been intensive opposition to new incinerator proposals in France, Belgium, Canada, Germany, Italy, UK and many other countries

“Even if we made incineration safe we would never make it sensible.

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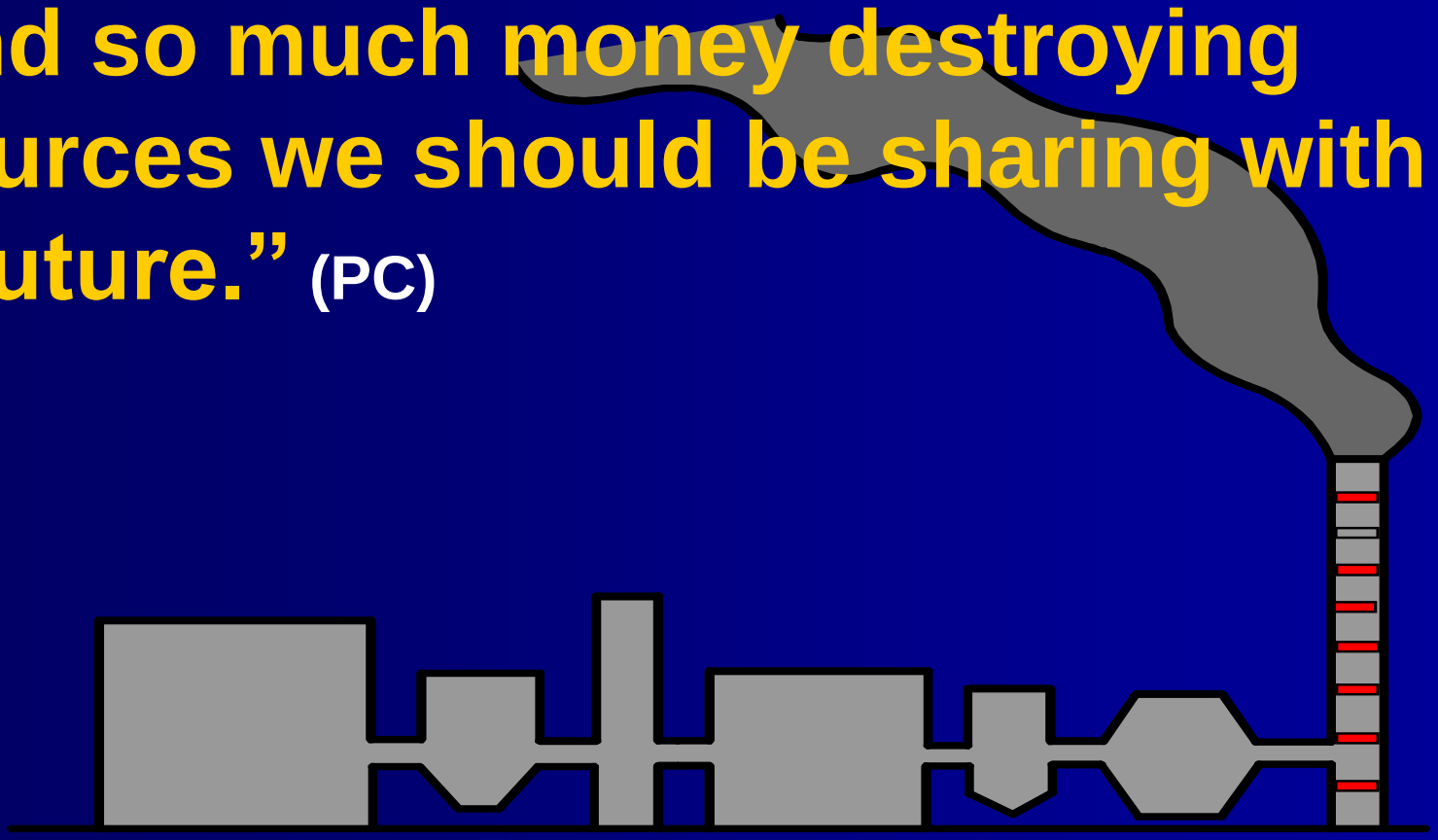
It simply does not make sense to spend so much money destroying resources we should be sharing with the future.” (PC)



The modern incinerator is attempting to perfect a bad idea

- Our task in the 21st Century is not to find better ways to destroy discarded materials
- But to stop making packaging and products that have to be destroyed!

10. There is a better alternative - the Zero Waste Strategy

The Waste problem will not be solved with better technology

- But with
- Better organization
- Better education
- and better industrial design