

Green Chemistry at the Local Level: *Precautionary Policies to Reduce Toxic Chemicals*



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**If it's legal to buy it must be
safe to use...**



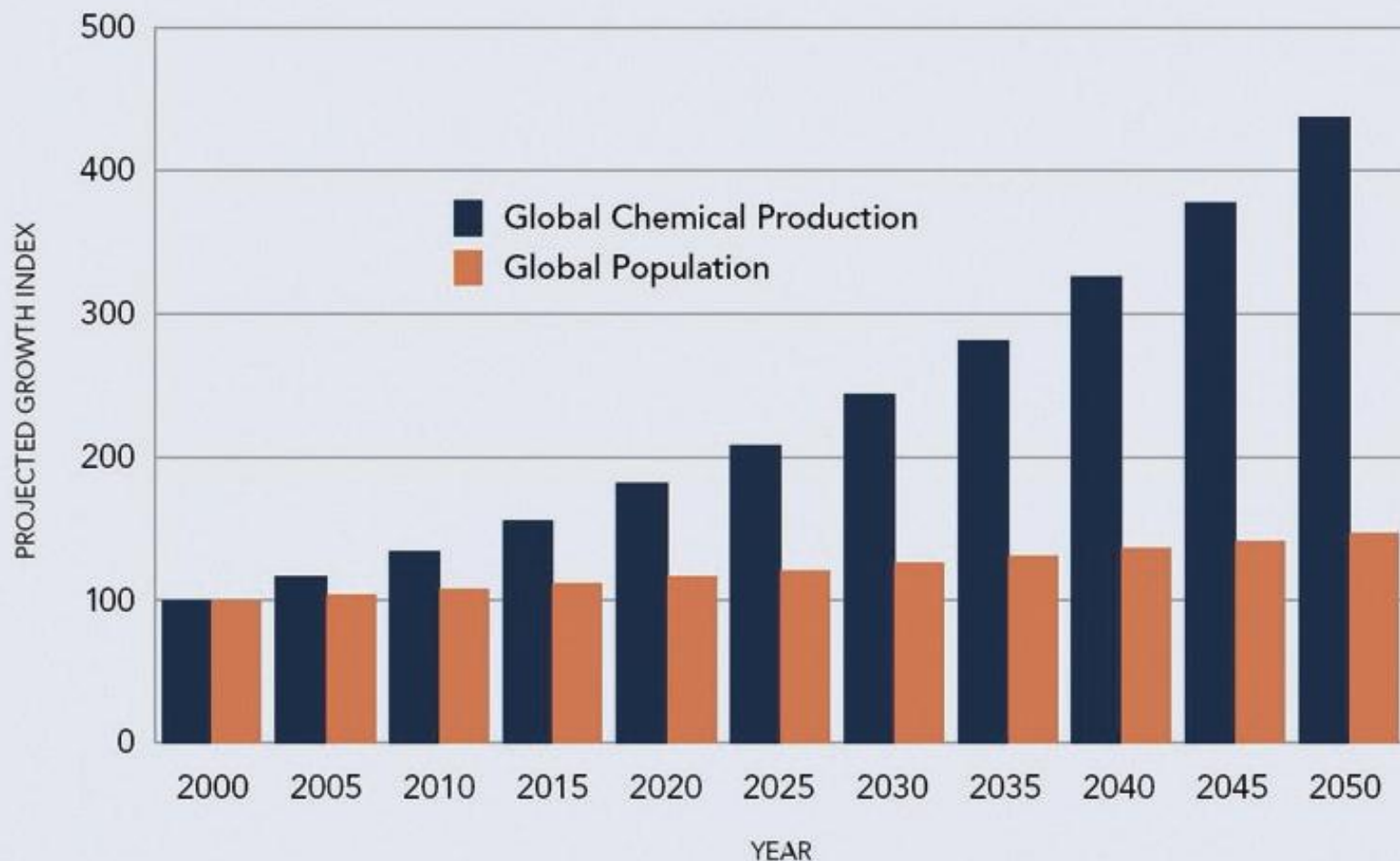
Scientific Uncertainty



80,000 chemicals in commerce

Small percentage have “complete” information

Chemical Production Shows No Sign of Slowing Down



Low doses matter

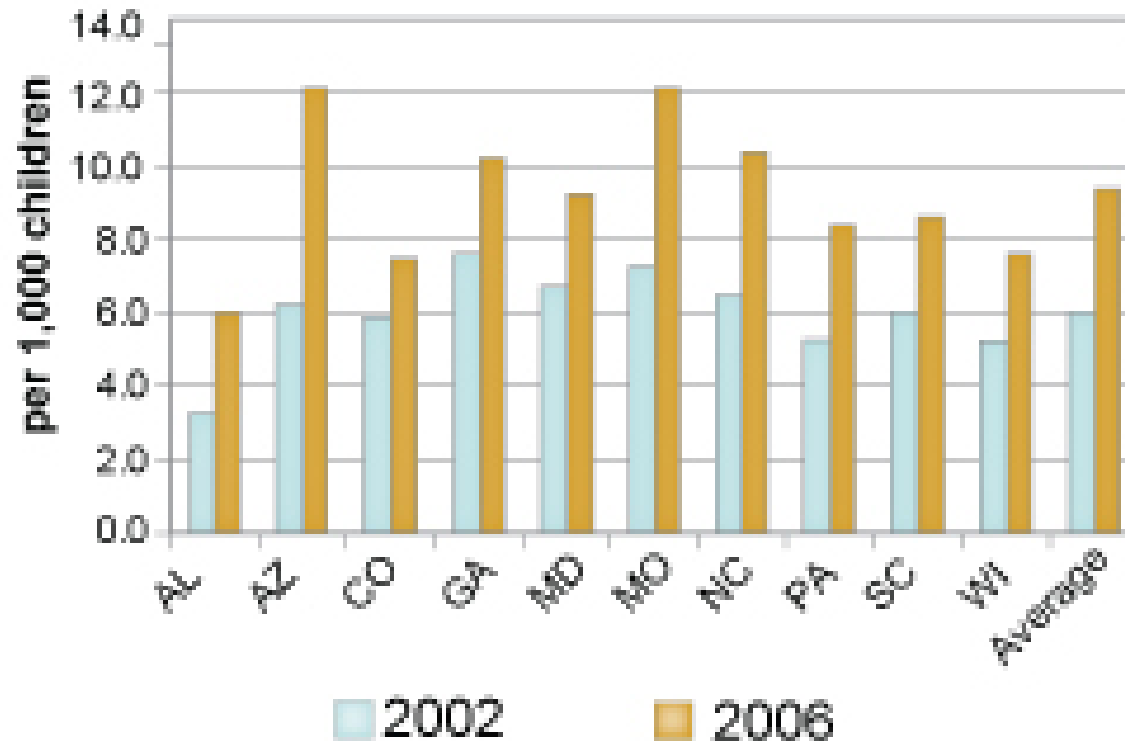


↑
100 ppb

↑
1 ppb

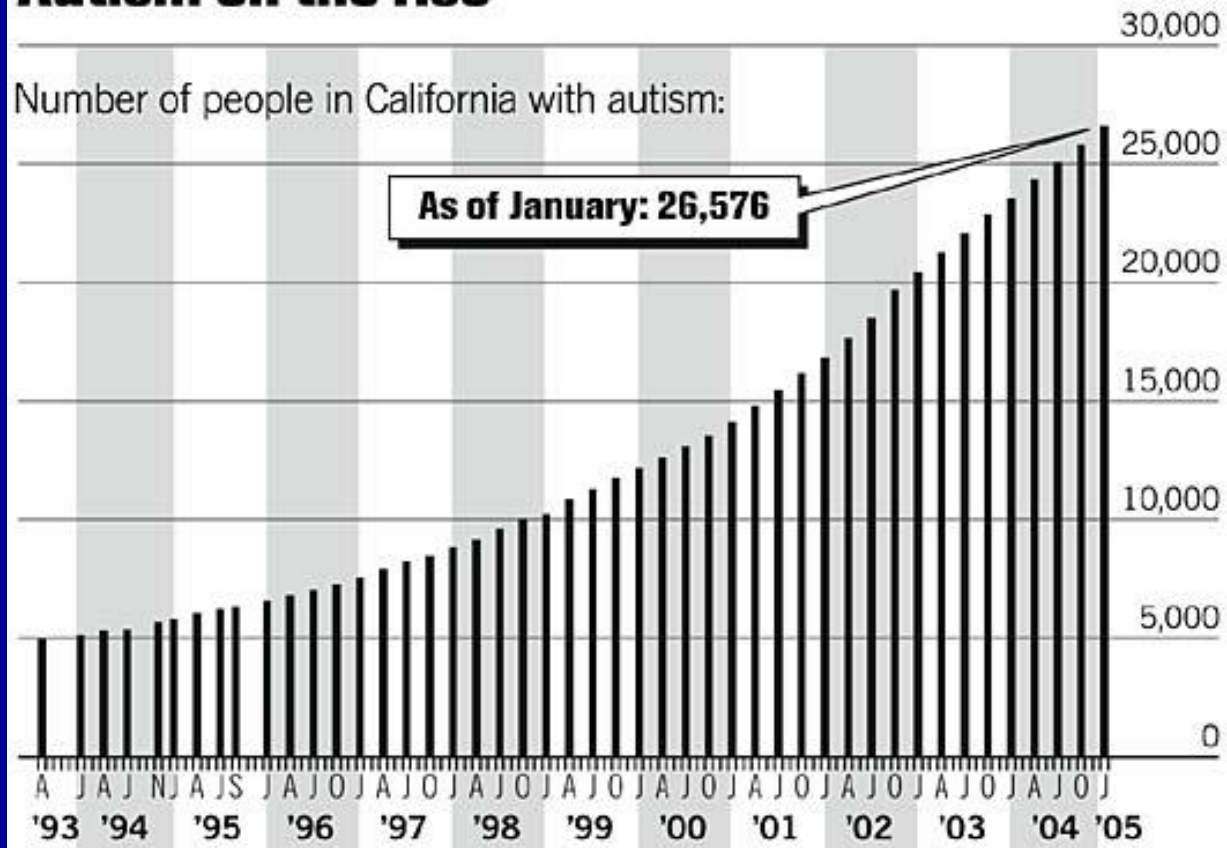
Expression of estrogen-responsive gene to DES in utero

Changes in Prevalence of ASDs among Children 8 Years Old, 2002 to 2006



Center for Disease Control and Prevention

Autism on the rise



Source: California Department of Developmental Services

The Chronicle

End-Of-Pipe Challenge for Local Governments



There's always a new “emerging contaminant”



Tricolsan



Phthalates



BPA

**Need policy tools that move
up-stream. That lead to
product redesign**

12 Principles of Green Chemistry*

1. Waste Prevention
2. Atom Economy
3. Less Hazardous Chemical Syntheses
4. Designing Safer Chemicals
5. Safer Solvents and Auxiliaries
6. Design for Energy Efficiency
7. Use of Renewable Feed stocks
8. Reduce Derivatives
9. Catalysis
10. Design for Degradation
11. Real-time analysis for Pollution Prevention
12. Inherently Safer Chemistry for Accident Prevention



* *Anastas, P. T.; Warner, J. C.; Green Chemistry: Theory and Practice, Oxford University Press: New York, 1998, p.30. By permission of Oxford University Press.*



Vorsorge prinzip



The Precautionary Approach

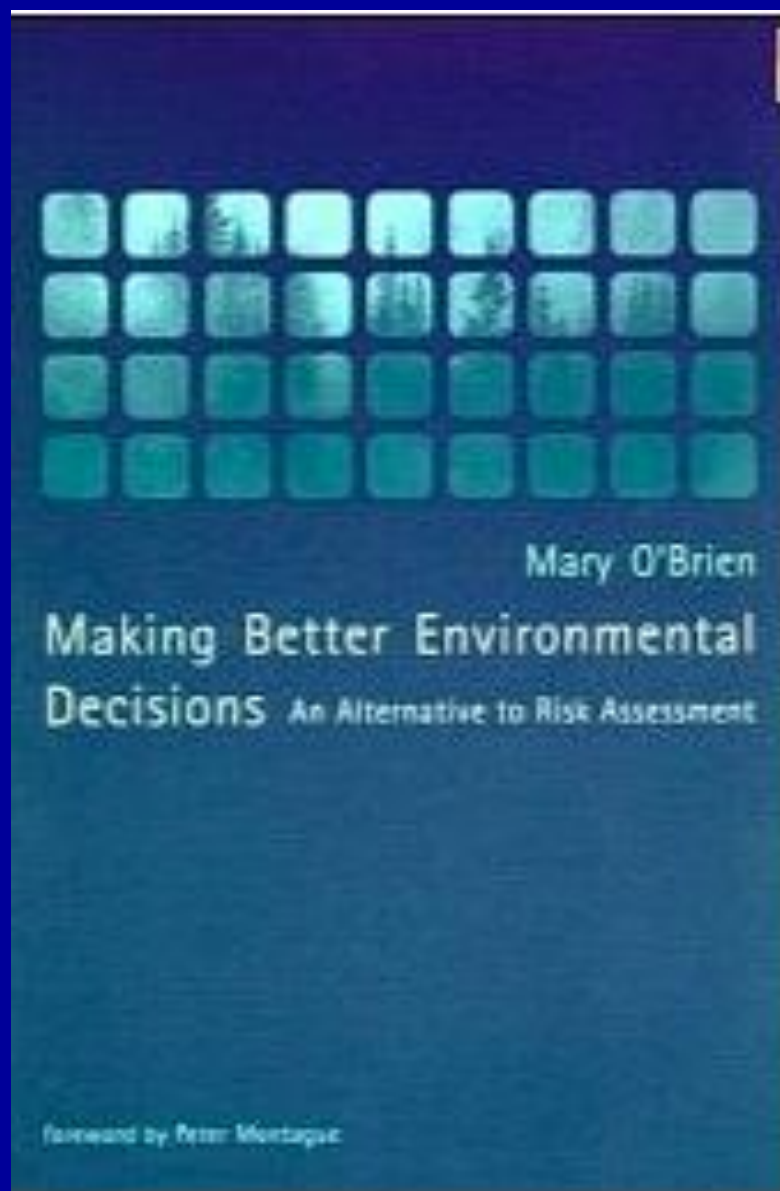


It is NOT sufficient to ask:

Is it legal?

Is it safe?

**We also MUST ask:
Is it necessary?**



How to determine if its necessary?

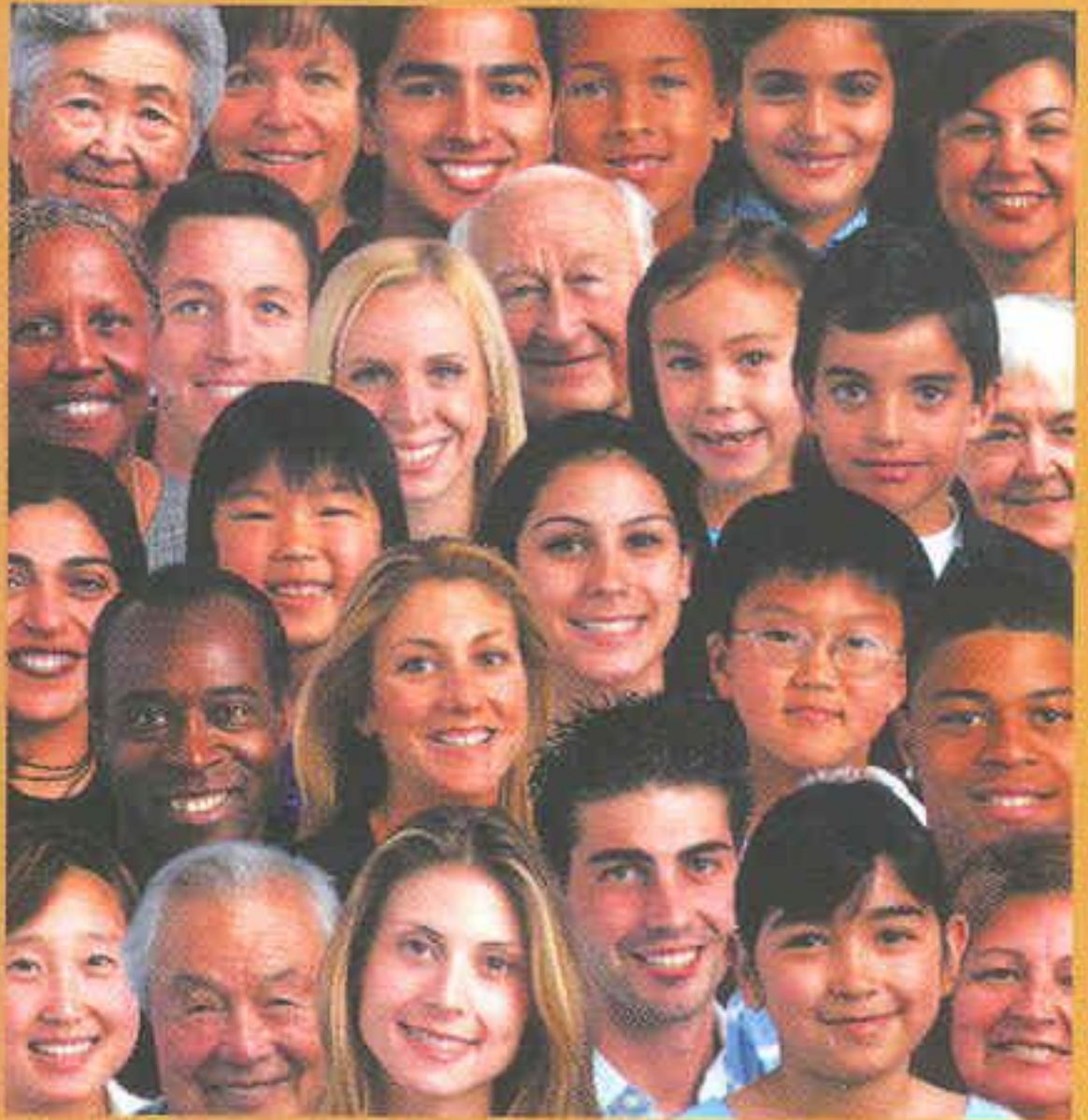
Risk Assessment

- What is an acceptable level of harm?
- Single activity considered

Alternatives Assessment

- Is this potentially hazardous activity (product) necessary?
- What less hazardous options are available?
- How little damage is possible?
- Multiple activities compared

Who
decides if it's
necessary?





Government Procurement



Gardeners ask :“Is it necessary?”

- **90% reduction in RoundUp because often it is not necessary**
 - Goats, hand weeding, flamers, compost tea
 - Prevention: mulch, sealing cracks
 - Acceptance (lawns as meadows)



Sometimes RoundUp is the alternative that minimizes harm



Median Strips



Invasive weeds in “Natural Areas”



Airport Runways

Promoting the “good guys”



**SAN FRANCISCO
GREEN
BUSINESS**

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San Francisco Green Businesses meet high environmental standards and are recognized by the City and County of San Francisco for their achievements.

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business spotlight



**food, lodging & recreation
Orchard Hotel**

You can relax and feel good about your green stay and amenities at the Orchard Hotel.

green your business

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The San Francisco Green Business Program is a program of the City & County of San Francisco.



The San Francisco Green Business Program is a member of the Bay Area Green Business Program.

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Alterations

Shirts
Dry Clean

1820

HOLIDAY CLEANERS

One Day
Service

Environmentally Friendly Dry Cleaning

We Clean
Your Clothes
Eco-Friendly



ENVIRONMENTAL



**FRIENDLY
PROCESS**

**VIRTUALLY NON TOXIC
BIODEGRADABLE**

ORGANIC *Dry* **CLEANING**

on the
World's Most Advanced
Drycleaning System



- ♥ No toxic solvent residue and ba
- ♥ Much softer feel of your garmer
- ♥ Extended life of your garments
- ♥ Much friendlier to our environm
- ♥ Our solvent* is so safe that eve
Rainbow trouts can live with it

*as approved for a regional EPA in Santa Clara County

Safer alternatives?



These petroleum solvents are made by



DRAFT - Not to be shared, quoted or cited

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TIER 1 SCREENING



Cancer, Mutagenicity and Genotoxicity	Mutagen: Interferes with conception/ Teratogen: Interferes with fetal development. Data includes evidence of carcinogenicity in animals.	Preservative BHT is a mutagen.	Skin tumors in animals	Preservative BHT is a mutagen.		Skin tumors, kidney/adrenal tumors	Uterine Tumors in rats	Clear evidence of carcinogen	PFOA			Carcinogenic	
Reproductive & Developmental Effects	Including reduction in fertility & birth outcomes, including but not limited to birth weight. Including physical and metabolic birth defects that are present at birth or manifest later, and effects on development of any kind, including, but not limited to motor or cognitive effects that result from exposure at any point		HFE, increased number of ribs in fetus				Reproductive organ deformation in rats		PFOA			Spontaneous abortions and congenital malformations	Prop 65 listed reproductive toxin
Neurological and neuro developmental effects	Substance that is capable of destroying or adversely affecting nerve tissue	Dizziness at high concentrations	Neurotoxicity of mineral spirits				Secondary effects on dopamine	Dizziness, intoxication				Dizziness, memory loss, confusion, difficulty speaking,	
Endocrine Disruption	Alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations						Effects on prolactin-weak estrogenic effects of similar compounds		PFOA				
Systemic Effect	Adverse effect that is of either a generalized nature or that occurs at a site distant from the point of entry of a substance: a systemic effect requires absorption and distribution of the substance in the body		Cardiac sensitivity for HFE - 7200			Organ damage from skin absorption						Heart irregularities, multiple organs affected	
Persistent, Bioaccumulative and Toxic (PBT)	Chemicals that are slow to degrade, collect in animal tissue or organs and are toxic to humans or animals. Concentrations in the environment increase over time, increasing the opportunity to exert their toxic effect	Half life of < than 6 days	Persistence		Bioaccumulation	Bioaccumulation	Bioaccumulation	Not Biodegradable	PFOA			Not biodegradable Persistent	
Toxic to aquatic organisms.	Adverse effects of marine life that result from being exposed to a toxic substance		Fish and Daphnia Toxicity			Moderately toxic to aquatic environment							

TIER 2 SCREENING

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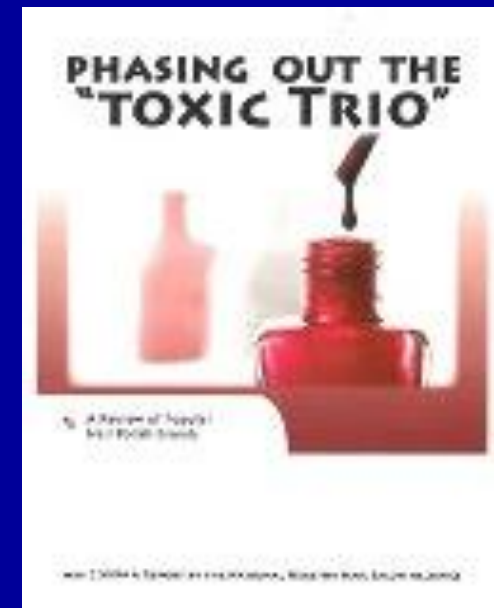


Comparison of Hazards, Regulatory Concerns, and Costs for Alternative Dry Cleaning Technologies

	Technology ¹	Total Annual Cost (for first 5 years) ²	Primary Human Health and Environmental Hazards	Air Regulations (Bay Area Air Quality Management District)	Health Regulations (Department of Public Health)	Fire Regulations (Fire Department)
	PROFESSIONAL WET CLEANING	\$20,926	• None Identified	N/A	• Detergent, spotters should be chosen to minimize environmental concerns • Possible annual fee for hazardous material storage (if ≥55 gal hazardous detergent stored on site)	N/A
	CO ₂ cleaning ²	\$58,881	• None Identified	N/A	• Possible annual fee based on volume of CO ₂ gas stored on site	• SFFD operational permit and annual fee • Use of Class I alkane co-solvent prohibited per Fire Code 1204.1
	Hydrocarbon solvents: • DF-2000™ • EcoSolv® • Shell Sol • PureDry®	\$27,755 - \$28,535	• Neurotoxicity, eye, skin and respiratory irritation • Potential concerns for persistence and aquatic toxicity • Complex mixtures which may contain other ingredients of concern	• Regulated under BAAQMD Rule 8-17 • Closed-loop machine required • Registration required • Permit required if >200 gal/yr gross solvent used	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site) & compressed gas storage (if ≥200 ft ³ N ₂)	• SFFD operational permit and annual fee • Combustible liquid (Class IIIA) • Ventilation, automatic sprinkler system, as specified in Fire Code Ch 12
	GreenEarth® (D5) solvent	\$32,718	• Suspected carcinogen, reproductive toxin • Liver, immune and nervous system effects • Persistent in environment; detected in fish	• Regulated under BAAQMD Rule 8-17 • Closed-loop machine required • Registration required • Permit required if >200 gal/yr gross solvent used	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site)	• SFFD operational permit and annual fee • Combustible liquid (Class IIIA)* • Ventilation, automatic sprinkler system, as specified in Fire Code Ch 12
	CO ₂ cleaning ² with Micell Technologies	\$58,881	• Possible use of perfluorooctanoic acid (PFOA) in Micell technology raises concerns for endocrine disruption, reproductive and developmental effects and persistence/bioaccumulation	N/A	• Possible annual fee based on volume of CO ₂ gas stored on site	• SFFD operational permit and annual fee • Use of Class I alkane co-solvent prohibited per Fire Code 1204.1
	Rynex™ solvent	\$26,220	• Chemical identity withheld as trade secret • Primary ingredient likely to be dipropylene glycol t-butyl ether (DGTBE) • DGBTE structurally related to a listed Proposition 65 carcinogen and predicted to be persistent	• Regulated under BAAQMD Rule 8-17 • Closed-loop machine required • Registration required • Permit required if >200 gal/yr gross solvent used	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site)	• SFFD operational permit and annual fee • Combustible liquid (Class IIIB) • Ventilation, automatic sprinkler system, as specified in Fire Code Ch 12
	Hydrocarbon solvent: • Perchloroethylene	\$28,308	• Contains aromatic hydrocarbons (e.g. benzene, a carcinogen) • Neurotoxic, eye, skin and respiratory irritation • Potential concerns for bioaccumulation and aquatic toxicity	• Regulated under BAAQMD Rule 8-17 • Closed-loop machine required • Registration required • Permit required if >200 gal/yr gross solvent used	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site)	• SFFD operational permit and annual fee • Combustible liquid (Class II) • Ventilation, automatic sprinkler system, as specified in Fire Code Ch 12
	Perchloroethylene	\$27,376	• Carcinogen (California's Proposition 65 list) • Liver and kidney effects • Neurotoxic, eye, skin and respiratory irritation • Persistent in the environment	• Regulated under BAAQMD Rule 11-16 • Secondary control technology required • Registration required • Permit required • Mandatory phase out in progress	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site)	N/A
	1- Propyl bromide	---	• Male and female reproductive toxicant and developmental toxicant (California's Proposition 65 list) • Neurotoxic, eye, skin and respiratory irritation	• Regulated under BAAQMD Rule 11-16 • Secondary control technology required • Registration required • Permit required	• Annual fee for hazardous waste generated • Annual fee for hazardous material storage (≥55 gal stored on site)	• ILLEGAL per CA Fire Code 1204.1 • Flammable liquid (Class I), NFPA rating



Nail Salons: Recognition Program







San Francisco Follows EU Lead: Bans Sale of Phthalates in Toys...



**Next came
California...**

**And then the
Nation.**

Other San Francisco Product Bans...



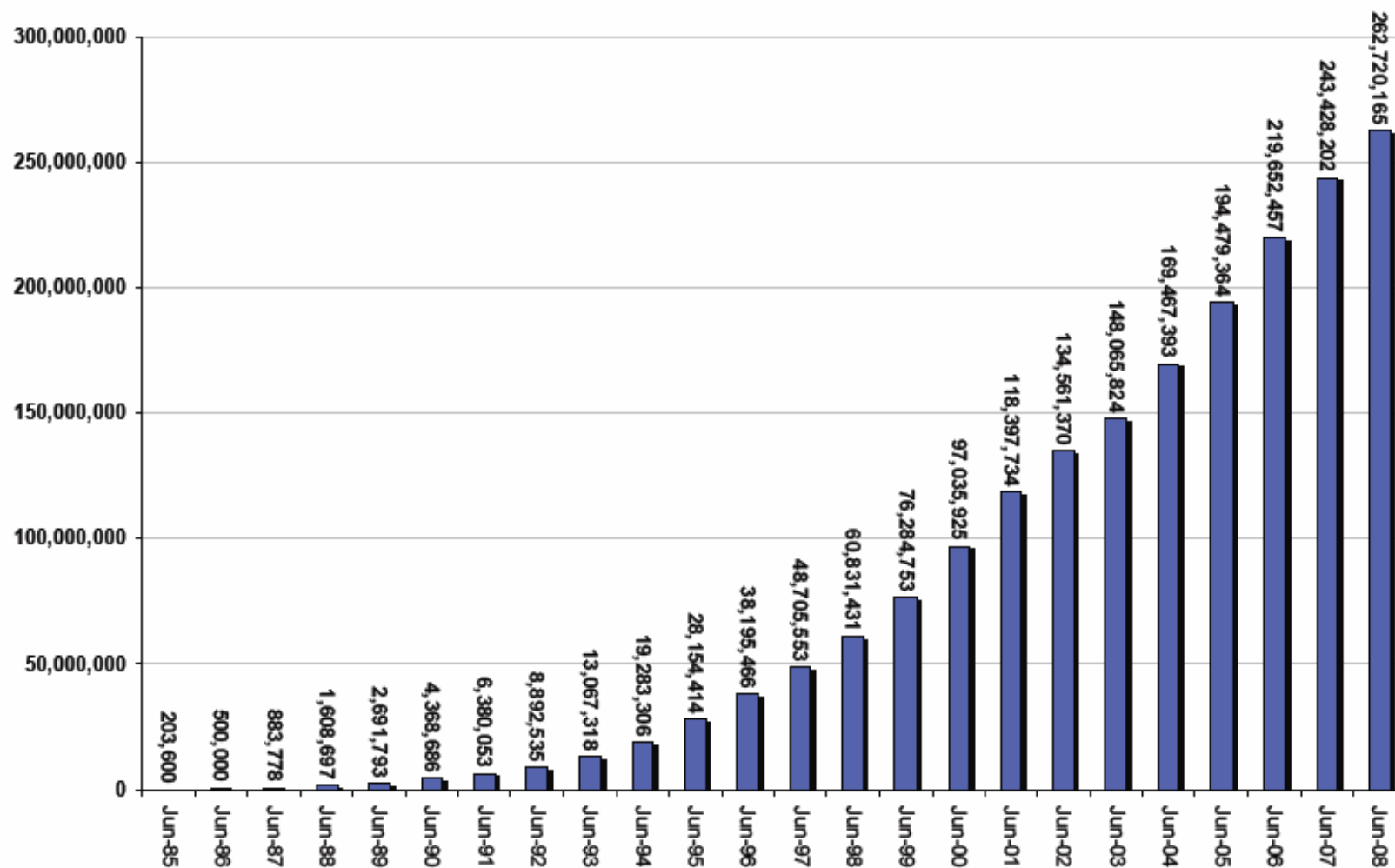
The power of information



Cell Phones



As of June 2008, There Were More Than 262 Million Wireless Subscribers in the U.S.



Source: CTIA Semi-Annual Survey

We use our phones twice as much as the nearest country.

How the U.S. Stacks Up Against Other Countries

CTIA
The Wireless Association*



USA



Japan



Germany



U.K.



France



Italy



Canada



Spain



S. Korea



Mexico

Subscribers**	262.7m	107.7m	103.4m	74.4m	55.4m	90.1m	20.6m	51.2m	45.0m	73.2m
Average Consumers' Minutes of Use per Month**	848	137	104	190	249	138	446	164	320	187
Average Revenue per Minute – A Measure of the Effective Price per Voice Minute**	\$0.05	\$0.25	\$0.21	\$0.16	\$0.17	\$0.18	\$0.11	\$0.24	\$0.11	\$0.09
Efficient Use of Spectrum – Subscribers Served per MHz of Spectrum Allocated	742,147	310,374	339,016	210,884	147,772	289,338	100,487	143,016	193,133	612,500
Spectrum Assigned for Commercial Wireless Use	354 MHz*	347 MHz	305 MHz	352.8 MHz	374.9 MHz	311.4 MHz	205 MHz	358 MHz	233 MHz	120 MHz

*Figure includes AWS-1 and 700 MHz spectrum not yet in use.

** Glen Campbell, et al., "Global Wireless Matrix 2Q08," Merrill Lynch, Sept. 25, 2008, at Table 1.

Radiation Penetrates Deeper into Younger Brains

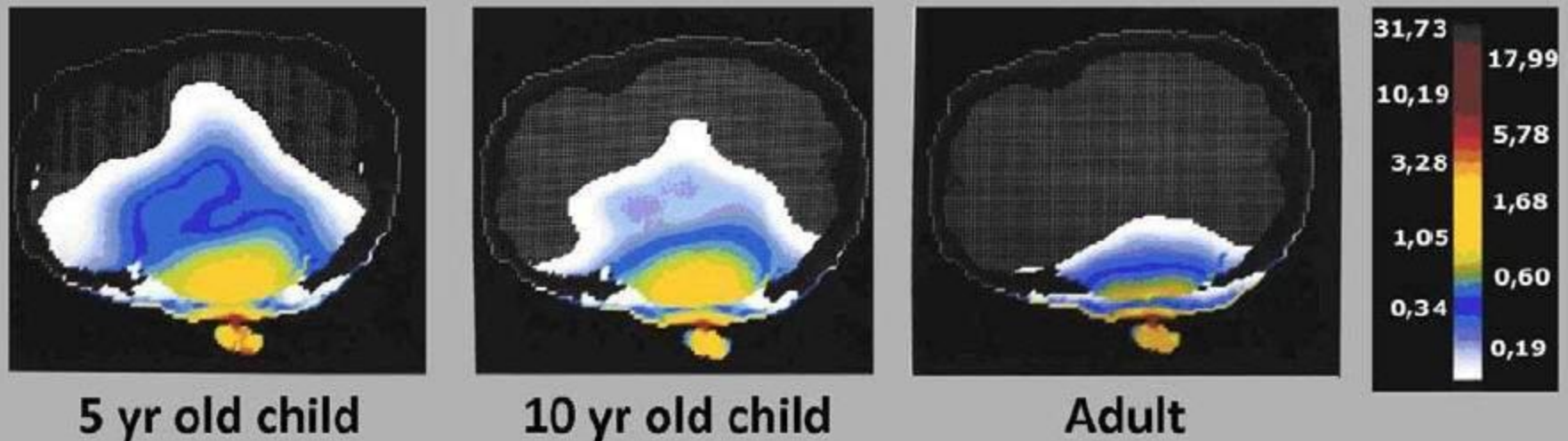


Figure 1. Estimation of the penetration of electromagnetic radiation from a cell phone based on age (Frequency GSM 900 Mhz) (On the right, a scale showing the *Specific Absorption Rate* at different depths, in W/kg) [1]

Younger and younger users



"Babyphone ... developed for the kids aged 3 to 8..."

Point of Purchase Display

LG NEON

- Full QWERTY keyboard
- 2.0MP camera
- Stereo Bluetooth® technology
- Monthly Geek Squad Black Tie Protection for \$6.99

FREE!
WITH NEW 2 YEAR ACTIVATION

SAR: Specific Absorption Rate
This Phone: _____ SAR out of 1.6
SAR: maximum relative amount of radiation absorbed by the head or body.
Ask at counter for supplemental information sheet



NATION PLANS REQUIRE MINIMUM \$20 /MONTH TEXT OR DATA PLAN.
See a Sales Associate for details.

Family Plan <small>(Phones purchased for lines 2-5)</small>	2 Year Upgrade Plan <small>(Individual and Family Plans)</small>	Regular Price <small>(Without activation)</small>
FREE!	FREE!	249⁹⁹

One year pricing options available - Ask an associate for details.
Manufacturer's warranty available upon request.

PKG: 222305
MOCK: 9330832
SKU: 9296601



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LEARN HOW TO REDUCE YOUR EXPOSURE TO CELL PHONE RADIATION.



New city law makes it easier for consumers to learn their cell phone's maximum radiation level, also known as the *Specific Absorption Rate*, or SAR.

Understanding Cell Phone Radiation

A debate exists about whether wireless phone use is linked to cancer and other illnesses. Specific Absorption Rate or SAR, is a measure of the type of radiation absorbed by the head and body when using a cell phone.

The Federal Communications Commission (FCC) requires that cell phones have SAR values of less than 1.6 watts per kilogram of body weight, as averaged over one gram of tissue, when used as directed by the manufacturer. Actual SAR levels during use can vary due to factors such as orientation to and distance from the head or body, proximity to a cell tower, and design of the phone.

Tips for Reducing Exposure to Cell Phone Radiation

Maximum SAR values are required to be posted in San Francisco stores offering cell phones. If you are concerned about cell phone radiation, you may choose to buy a cell phone with a lower maximum radiation (SAR) level.

In addition, the FCC advises that those concerned about the risks of cell phone radiation can take the following precautions:

- **Use an earpiece, headset, or speaker function.** Earpieces, headsets and speaker functions help keep cell phones away from the head, and thus can greatly reduce radiation exposure to your head. However, because wireless earpieces also emit a small amount of radiation, turn them off when not in use.
- **Keep distance between cell phones and your body.** Cell phone radiation is continually emitted from your phone when it is on. The further the phone is from your body, the less radiation your body absorbs.
- **Text instead of talking.** Limiting talk time can reduce radiation exposure. Never text while driving.



Learn more:

Federal Communications Commission
FCC.gov/cgb/consumerfacts/mobilephone.html

SF Department of the Environment
SFEnvironment.org/cellphoneradiation • (415) 355-3700

Bay Area

Inside

Convicted: Couple plead no contest to robbing crash victims' home C2

SAN FRANCISCO CHRONICLE AND SFGATE.COM | Saturday, July 24, 2010 | Section C ★★★★★

SAN FRANCISCO

Wireless industry sues over law

City wants cell phone radiation levels posted in stores

By John Wildermuth
CHRONICLE STAFF WRITER

A cellular industry group went to court Friday to quash San Francisco's landmark ordinance requiring radiation levels to be publicly listed for

every cell phone sold in the city.

The ordinance overwhelmingly approved last month by the Board of Supervisors "will confuse and mislead the public" by suggesting that the level of radiation emitted by federal-

ly approved phones has a relation to health risks, CTIA, the wireless industry's association, said in its suit, which was filed in federal court in San Francisco.

"The message sent to con-
Radiation continues on C3



"This law is not an attack on the wireless industry or their products. This is a modest ... measure which ... takes information ... and makes it more accessible and easier to find."

Mayor Gavin Newsom



The Bigger Picture: Chemicals Policy Reform



AB 1879

www.dtsc.ca.gov

CA Dept. of Toxic Substance Control

The Precautionary Principle offers a powerful vision for moving forward



The Precautionary Principle

≠ Zero risk

= Minimize harm

≠ Zero science

= Maximize info./science

≠ Loss of jobs

= Increase innovation

**≠ Predetermined outcome
(i.e. ban)**

**= Transparent Process for public
decision making**

So that when we ask:

It is legal?

Confident our laws are protective of all life

Is it safe?

Sufficient data and testing so that we understand chemical effects on organisms and ecosystems

Is it necessary?

Affected communities are at the table, all are empowered to examine alternatives, and to choose those that minimize harm

