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ACS WEBINARS™
November 18, 2010

How Chemical Policy Reform Can Spur Green Chemistry



Speaker: Richard Denison, PhD
Environmental Defense Fund



Moderator: Robert Rich, PhD
ACS Office of Strategy Development

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How Chemical Policy Reform Can Spur Green Chemistry

ACS Webinar
Green Chemistry & Sustainability Series
November 18, 2010

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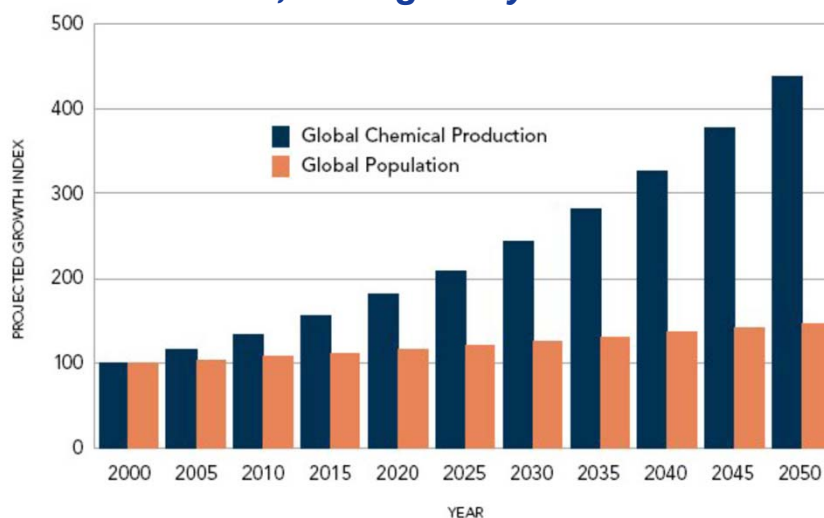


What's the problem?

Chemicals are ubiquitous

- >27 trillion pounds produced per year in the U.S.
 - 250 pounds per person per day
- Used to make 96% of all materials and products
- Number of chemicals in U.S. commerce unknown
 - 84,000 listed on Toxic Substances Control Act (TSCA) Inventory – not all in commerce today
 - 62,000 were on the market in 1979 (1st Inventory)
 - 23,000 new chemicals added since (ca. 1,500 per year)
 - 7,000 chemicals reported at $\geq 25,000$ lbs/yr/site in 2005
 - but many reporting exemptions

Global chemical production to double between 2000 and 2024, and again by 2050



Sources: American Chemistry Council 2003; OECD 2001; United Nations 2004

Rising incidence of certain diseases/ disorders linked to chemical exposures

FIGURE 1. TRENDS IN REPRODUCTIVE HEALTH AND CHILDHOOD CANCERS, UNITED STATES



The incidence of certain pediatric and reproductive health disorders is on the rise, including hypospadias, reduced sperm count (variable by region), and the childhood cancers that are most commonly linked to chemical exposures. Source: Sharpe and Irvine, 2004, Surveillance Epidemiology and End Results (SEER) Program 2004.¹⁷

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Some of the chemicals widely detected in the US population

Chemical	Percent of US population with measurable levels*	Sources
Phthalates (7 kinds)	50 – 97%	Flooring, wall covering, medical devices, food wrap, personal care products, lacquers
Bisphenol A	92%	Polycarbonate plastic, food can lining dental sealant
Perfluorinated compounds (4 types)	91-99%	Nonstick cookware, stain resistant fabrics, food packaging, dental products
PBDEs (many)	100% (with at least one congener)	Chemical flame retardants, upholstery, carpet, electronics
Triclosan	80%	Antimicrobial agent , soaps
PCBs (many)*	100% (with at least one congener)	Banned in 1977 – persistent through food

*Representative US sample from NHANES/CDC generally from 2003/2004, PCBs for women ages 16-39

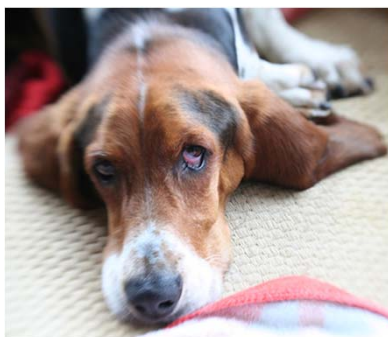
Main U.S. Chemical Safety Legislation

- Toxic Substances Control Act of 1976 (TSCA)
 - Covers most chemicals used in industry and in commercial/consumer products
 - Excludes:
 - uses in drugs, cosmetics, food and food packaging regulated by FDA
 - uses in pesticides covered by EPA under FIFRA
 - Basic provisions have never been amended

Problems with the current paradigm

- Presumption of innocence: TSCA grandfathered 10,000s of chemicals
- Default: No or uncertain info = No action
- Evidence of risk needed to require testing
- Proof of harm needed to regulate
- Govt. shoulders burden of proof
- Contrast to pesticides, drugs
- Excessive trade secret allowances deny information to the public and the market

TSCA, the Dog that Didn't Even Bark



By the numbers:

- **62,000** chemicals grandfathered in when TSCA was passed in 1976
- Required testing on **<300** in 34 years
- **5** chemicals have been regulated in limited ways
- **19 years** since EPA last tried (and failed) to regulate a chemical: *asbestos*

Drivers for TSCA Reform

- Major reform of others' policies: REACH, CEPA
- State legislation and policy changes
 - Shift from bans to policies: CA, ME, WA
- GAO put chemicals on its 2009 “high-risk” list
- 1 of 5 top priorities of new EPA Administrator
- EPA: Principles for TSCA reform issued last Sept.
- Congressional action: Oversight hearings, CPSC phthalate ban, formaldehyde in plywood
- Market demand, esp. from downstream users
- ACC: “TSCA is in dire need of modernization”

What role for Green Chemistry? Questions to consider

- green chemistry vs. Green Chemistry
 - Are they the same or different?
- Chemicals policy/regulation
 - Are they part of G/green C/chemistry?
 - Might they not help to promote it?
- Proposal: A “supply-demand framework” to advance green chemistry

Supply side of Green Chemistry

- Supply-side options – including initiatives in education, training and research and economic incentives – help to facilitate innovation in the creation and dissemination of greener chemicals, processes and technologies.

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Demand side of Green Chemistry

- Demand-side options help to ensure the economic viability of greener chemicals by better informing the market, leveling the playing field on which greener options compete, and creating a regulatory climate that drives both the development and the adoption of greener alternatives.

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ACS Green Chemistry Institute's Vision

- *Enabling and catalyzing the implementation of green chemistry and engineering principles into all aspects of the global chemical enterprise.*
 - not so different from supply and demand

Supply-side Options

- Instill green chemistry into education
- Support research and innovation in green chemistry and engineering
- Build capacity through development of tools, methodologies and strategies for developing greener chemicals
- Provide incentives to industry and recognition of its efforts

Demand-side Options

- Push chemical information out into marketplace
- Identify and prioritize chemicals or chemical uses of concern for assessment
- Require proof of safety to stay on market
- Develop, improve and effectively employ regulations to address unsafe chemicals or uses

U.S. Legislation: Proposed in 2010

- *SENATE: Safe Chemicals Act* (S. 3209) introduced by Senator Lautenberg
- *HOUSE: Toxic Chemicals Safety Act* (H.R. 5820) introduced by Chairmen Rush and Waxman

Green chemistry provisions

TSCA

- No provisions

Reform legislation

- Establishes programs, policies and research programs promoting green chemistry and safer alternatives.
- Provides expedited pathway onto market for new chemicals shown to be inherently safe or safer than an existing chemical substances for a given use.

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Currently under TSCA	Under Reform Proposals
DATA: Few chemicals are required to be tested and no minimum data set is required even for new chemicals.	A minimum data set (MDS) on all new and existing chemicals is required to be developed and made public.
BURDEN OF PROOF: EPA is required to prove harm before it can regulate a chemical.	Industry bears the legal burden of proving its chemicals are safe.
SAFETY ASSESSMENT: No mandate exists to assess the safety of existing chemicals. New chemicals undergo a severely time-limited and highly data-constrained review.	All chemicals, new and existing, would be subject to a full safety determination.

Currently under TSCA	Under Reform Proposals
<p><u>SCOPE OF ASSESSMENT:</u> There is no requirement to assess exposure to all sources of exposure to a chemical, or to assess risk to vulnerable populations.</p>	<p>Safety determination is based on aggregate exposure to all uses and sources, and must ensure protection of vulnerable populations. Cumulative effects and the full lifecycle of a chemical must be considered.</p>
<p><u>REGULATORY ACTION:</u> Even chemicals of highest concern, such as asbestos, have not been able to be regulated under TSCA.</p>	<p>Chemicals are assessed against a health-based standard, and deadlines for decisions are specified.</p> <p>Chemicals of highest concern will be subject to expedited actions to reduce use or exposure to them or be first in line for safety determinations.</p>

Currently under TSCA	Under Reform Proposals
<p><u>INFORMATION ACCESS:</u> Companies are free to claim, often without providing any justification, most information they submit to EPA to be confidential business information (CBI), denying access to the public and even to state and local government. EPA is not required to review such claims, and the claims never expire.</p>	<p>All CBI claims would have to be justified up front. EPA would be required to review a representative sample. Claims would expire after a period of time unless renewed. Other levels of government would have access to CBI.</p>
<p><u>RULEMAKING REQUIREMENTS:</u> To require testing or take other actions, EPA must promulgate regulations that take many years and resources to develop.</p>	<p>In addition to the MDS requirement, EPA would have authority to issue an order rather than a regulation to require existing data to be reported or additional testing to be done.</p>

Public policy drives innovation

EU survey of 90 leading environmental technology companies in 13 countries*

Q: What are the key external success factors for innovation:

#1: Government policy: Most effective are traditional regulations

#2: Market demand, best driven by government policy

*Henzelmann et al. 2007. Innovative environmental growth markets from a company perspective.

DuPont's view of REACH

“We are implementing REACH as a global program across DuPont, and the impact of REACH will be varied and widespread. We see it as potential to drive market innovation.”

There are chemicals that may be restricted under REACH, and it'll provide the opportunity for a science company like DuPont to develop replacement products to satisfy market needs.”

- Rick Straitman, DuPont, quoted in *Greenwire*, 6/08

For more information

TSCA, REACH & CEPA: *Not That Innocent*

www.edf.org/chempolicyreport

TSCA Reform: Policy Papers and Reports,
Congressional Testimony

www.edf.org/page.cfm?tagID=12814

EDF Chemicals & Nanomaterials Blog

www.edf.org/chemandnano

Safer Chemicals Healthy Families coalition

www.saferchemicals.org

Q&A SESSION



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Thursday, December 2, 2010 at 2:00 pm EDT

Venture Capital Outlook in 2011 – Crystal ball, Smoke screen, and the Reality

David Porter, Managing Partner at Apposite Capital



Thursday, December 9, 2010 at 2:00 pm EDT

Kitchen Chemistry: Combining Chemistry and Culinary Delights for the Holiday

Shirley Corriher, Chemist and Author of *CookWise: The Hows and Whys of Successful Cooking*
Peter Barham, Professor of Physics at Bristol University UK



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