



GREEN SCIENCE  
POLICY INSTITUTE

# Tackling Toxics: The Chemical Class Approach Toward Healthier Products and Materials

Arlene Blum, Ph.D.

April 3, 2018











# Brominated Tris Flame Retardant

*Tris (2,3-dibromopropyl) phosphate*

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- In children's sleepwear 1975 to 1977
- Up to 10% of the weight of fabric
- In children's urine
- Mutagen and possible carcinogen





















Science, January 7, 1977

# **Flame-Retardant Additives as Possible Cancer Hazards**

The main flame retardant in children's pajamas is a  
mutagen and should not be used.

Arlene Blum and Bruce N. Ames



**U.S. Consumer Product  
Safety Commission**

# TRIS-Treated Children's Garments Banned

April , 1977

Chlorinated Tris replaced Brominated Tris

- Removed from pajamas in 1978
- Used in furniture until 2012



# Annapurna

A WOMAN'S PLACE

The dramatic  
story of the first  
American ascent of  
one of the world's  
highest peaks



ARLENE BLUM

20TH ANNIVERSARY EDITION

With a new Preface and Afterword by the author

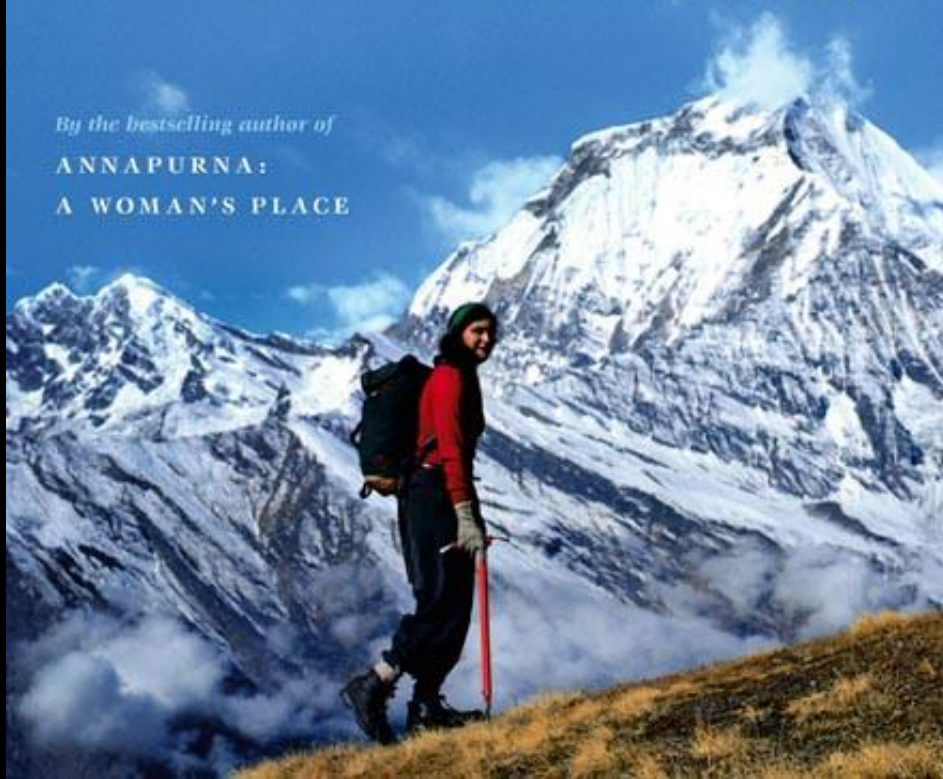
Arlene Blum

# BREAKING TRAIL

*A Climbing Life*

*By the bestselling author of*

ANNAPURNA:  
A WOMAN'S PLACE







# GREEN SCIENCE POLICY INSTITUTE

**Environmental Science & Technology**  
Building Research & Information (2022) 48(6):738-755

**Building insulation: using codes**

**Novel and High Volume Use Flame Retardants in US Couches**  
Heather M. Thomas F.  
Nicholas S.  
Departments  
Support

**Fluorine**  
Laurel A. Margaret  
Silent Sp  
Californi  
Green  
Depart  
Enter  
Natio  
Unit  
Che  
Ox  
Di

**Environmental Letters**  
Science & Technology

**Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants**  
Xindi C. Hu,<sup>1,2</sup> David Q. Andrews,<sup>3</sup> Andrew B. Lindstrom,<sup>4</sup> Thomas A. Bruton,<sup>4</sup> Laurel A. Schaidt,<sup>4</sup> Philippe Grandjean,<sup>5</sup> Rainer Lohmann,<sup>6</sup> Courtney C. Carignan,<sup>7</sup> Arlene Blum,<sup>1,3</sup> Simona A. Balan,<sup>8</sup> Christopher P. Higgins,<sup>9</sup> and Elsie M. Sunderland<sup>1,2</sup>

<sup>1</sup>Harvard T. H. Chan School of Public Health, Boston, Massachusetts 02215, United States  
<sup>2</sup>Harvard John A. Paulson School of Engineering and Applied Sciences, Cambridge, Massachusetts 02138, United States  
<sup>3</sup>Environmental Working Group, Washington, D.C. 20009, United States  
<sup>4</sup>National Exposure Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, United States  
<sup>5</sup>University of California at Berkeley, Berkeley, California 94720, United States  
<sup>6</sup>Silent Spring Institute, Newton, Massachusetts 02460, United States  
<sup>7</sup>University of Rhode Island, Narragansett, Rhode Island 02882, United States  
<sup>8</sup>Green Science Policy Institute, Berkeley, California 94705, United States  
<sup>9</sup>California Department of Toxic Substances Control, 1001 I Street, Sacramento, California 95814, United States (Formerly at the Green Science Policy Institute, Berkeley, California 94705, United States)  
<sup>10</sup>Colorado School of Mines, 1500 Illinois Street, Golden, Colorado 80401, United States

**Supporting Information**

**ABSTRACT:** Drinking water contamination with poly- and perfluoroalkyl substances (PFASs) poses risks to the developmental, immune, metabolic, and endocrine health of consumers. We present a spatial analysis of 2013–2015 national drinking water PFAS concentrations from the U.S. Environmental Protection Agency's (U.S. EPA) third Unregulated Contaminant Monitoring Rule (UCMR3) program. The number of industrial sites that manufacture or use these compounds, the number of military fire training areas, and the number of wastewater treatment plants are all significant

**Hydrological units with detectable PFASs**

**Meaning the drinking water**

**Meaning the drinking water**



## Education



## Research

## Retreats

# Policy & Purchasing Change

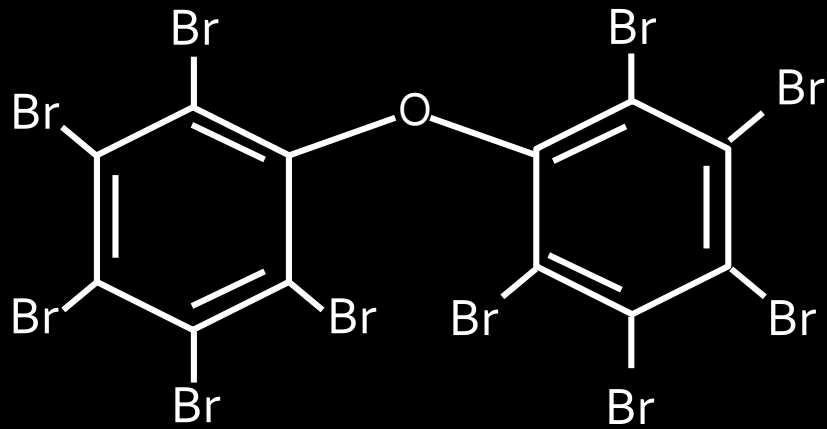
# U.S. Toxic Substances Control Act (1976)

- 62,000 previous chemicals “grandfathered”
- 23,000 new chemicals
  - 85% have no health data
  - 67% have no data at all





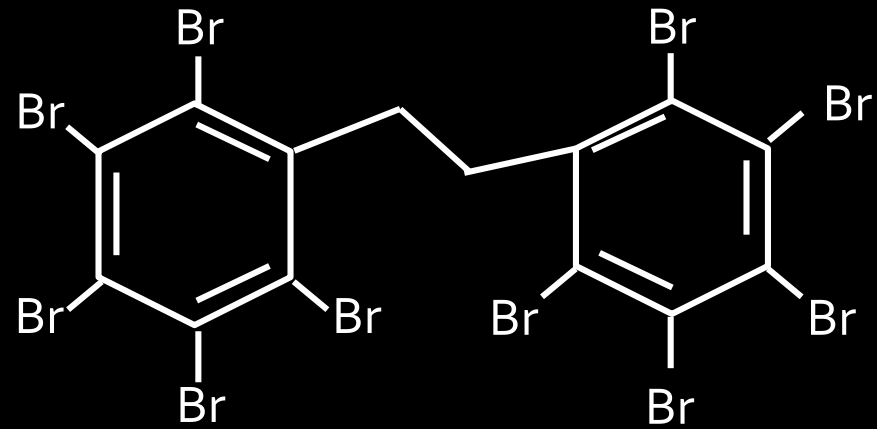
# Regrettable Substitution



Decabromodiphenyl  
ether

Concerns:

- Persistence
- Bioaccumulation
- Toxicity



Decabromodiphenyl  
ethane

Concerns:

- Persistence
- Bioaccumulation
- Toxicity

# Six Classes Videos

An innovative approach to reducing toxics

1

Highly  
Fluorinated

2

Antimicrobials

3

Flame  
Retardants

4

Bisphenols  
+ Phthalates

5

Some  
Solvents

6

Certain Metals



**VIEW and SHARE: [www.SixClasses.org](http://www.SixClasses.org)**

Healthier products, healthier people in four minutes!

Is it necessary?

Is it worth it?

Is there a safer alternative?



Classes 1 to 3

# Periodic table of elements

hydrogen 1 H 1.0079												Halogens					helium 2 He 4.0026	
lithium 3 Li 6.941	beryllium 4 Be 9.0122											boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180	
sodium 11 Na 22.990	magnesium 12 Mg 24.305											aluminium 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948	
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80	
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29	
caesium 55 Cs 132.91	barium 56 Ba 137.33	57-70 ★	lutetium 71 Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 190.23	iridium 77 Ir 192.22	platinum 78 Pt 195.08	gold 79 Au 196.97	mercury 80 Hg 200.59	thallium 81 Tl 204.38	lead 82 Pb 207.2	bismuth 83 Bi 208.98	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]
francium 87 Fr [223]	radium 88 Ra [226]	89-102 ★ ★	lawrencium 103 Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [269]	meitnerium 109 Mt [268]	ununnium 110 Uun [271]	ununium 111 Uuu [272]	unubium 112 Uub [277]	ununquadium 114 Uuq [289]					

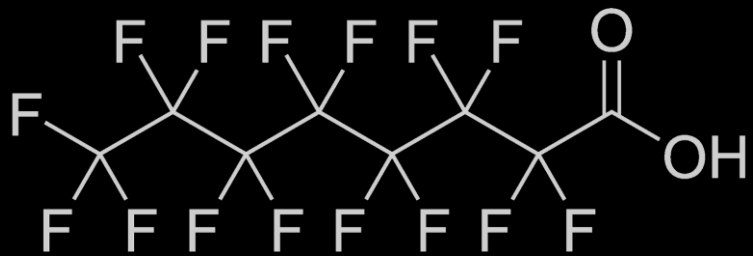
\* Lanthanide series

lanthanum 57 <b>La</b> 138.91	cerium 58 <b>Ce</b> 140.12	praseodymium 59 <b>Pr</b> 140.91	neodymium 60 <b>Nd</b> 144.24	promethium 61 <b>Pm</b> [145]	samarium 62 <b>Sm</b> 150.36	europium 63 <b>Eu</b> 151.96	gadolinium 64 <b>Gd</b> 157.25	terbium 65 <b>Tb</b> 158.93	dysprosium 66 <b>Dy</b> 162.50	holmium 67 <b>Ho</b> 164.93	erbium 68 <b>Er</b> 167.26	thulium 69 <b>Tm</b> 168.93	ytterbium 70 <b>Yb</b> 173.04
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\*\* Actinide series

actinium 89 <b>Ac</b> [227]	thorium 90 <b>Th</b> 232.04	protactinium 91 <b>Pa</b> 231.04	uranium 92 <b>U</b> 238.03	neptunium 93 <b>Np</b> [237]	plutonium 94 <b>Pu</b> [244]	americium 95 <b>Am</b> [243]	curium 96 <b>Cm</b> [247]	berkelium 97 <b>Bk</b> [247]	californium 98 <b>Cf</b> [251]	einsteinium 99 <b>Es</b> [252]	fermium 100 <b>Fm</b> [257]	mendelevium 101 <b>Md</b> [258]	nobelium 102 <b>No</b> [259]
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# Class 1: Highly Fluorinated Chemicals



PFOA



Carbon-Fluorine bond strength:

- Leads to oil and water repellency
- “Forever chemicals” -- last for geologic time!



# Common Uses



CARPETS



CARPET CLEANING PRODUCTS



FOOD PACKAGING



FURNISHINGS



COSMETICS



OUTDOOR GEAR



CLOTHING



ADHESIVES AND SEALANTS



PROTECTIVE COATINGS



NON-STICK COOKWARE

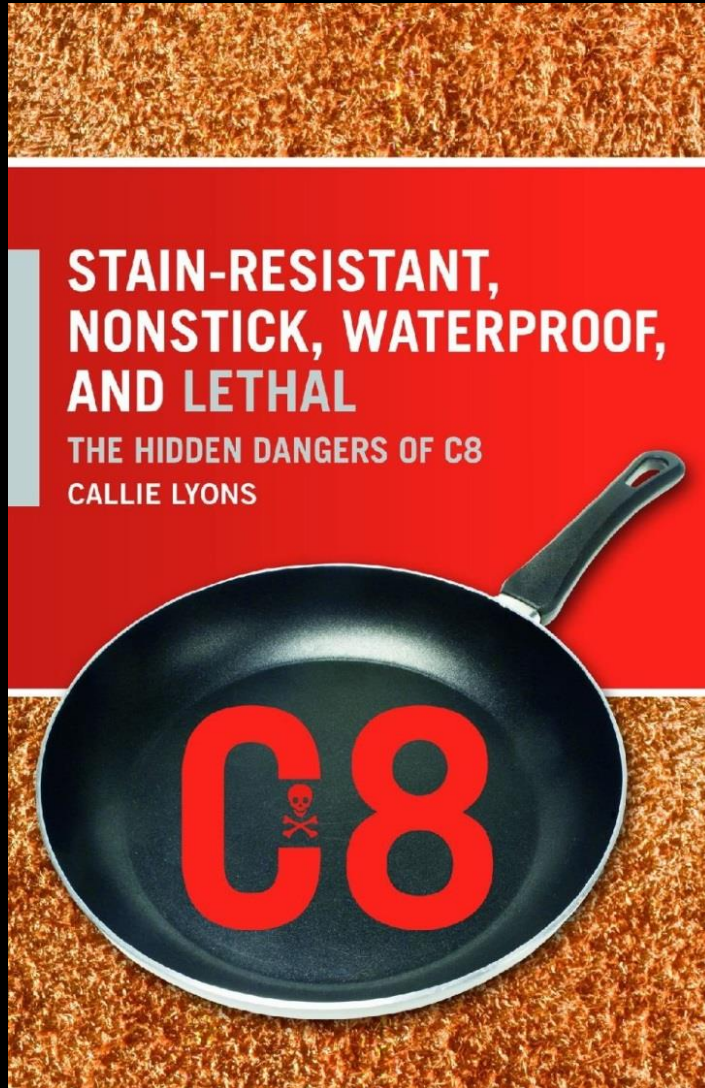


CARSEATS



FIREFIGHTING FOAM

Published 2007



2017

Watershed

Tracy K. Smith

US Poet Laureate

200 cows      more than 600 hilly  
acres  
property would have been even  
larger  
had J not sold 66 acres to DuPont  
for  
waste from its  
Washington Works factory  
where J was employed  
did not want to  
sell  
but needed money      poor  
health  
mysterious ailments

# PFAS exposure is a health concern

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Exposure linked to health risks:

Cancer, elevated cholesterol, obesity, immune suppression, endocrine disruption

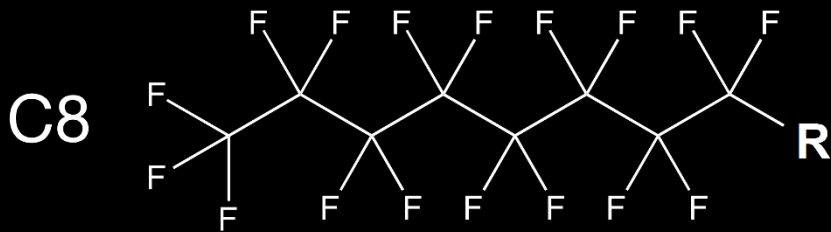
(Ref: Lewis et al., 2015; Grandjean et al., 2012;  
Braun et al., 2016; Barry et al., 2013)

Courtesy, Cindy Hu, Harvard University



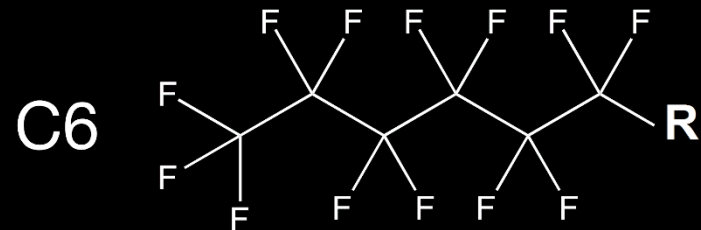
# Is C6 an improvement over PFOA and PFOS?

C6 is called the “environmentally friendly” alternative



## Concerns:

- Extreme persistence
- Bioaccumulation
- Toxicity



## Concerns:

- Extreme persistence
- Bioaccumulation in plants
- Suspected toxicity
- More mobile
- Remediation more difficult

# May 2015 The Madrid Statement on Highly Fluorinated Chemicals



“We call on the international community to cooperate in limiting the production and use of PFASs and in developing safer non-fluorinated alternatives.”

Signed by 230 scientists from 40 countries

2015: Environmental Health Perspectives

# 2015-16

The Opinion Pages | OP-ED COLUMNIST

The New York Times

## Chemicals in Your Popcorn?

JUNE 4, 2015



Nicholas Kristof

What do a pizza box, a polar bear and you have in common?

All carry a kind of industrial toxicant called poly- and perfluoroalkyl substances, or PFASs, that do two things: They make life convenient, and they also appear to increase the risk of cancer.

## These Chemicals in Pizza Boxes and Carpeting Last Forever

More than 200 scientists around the world document the threats of perfluorinated compounds and call for more government control.

By **Lindsey Konkel**, National Geographic  
PUBLISHED MAY 01, 2015



NATIONAL  
GEOGRAPHIC

The  
Intercept\_

## THE TEFLON TOXIN

DuPont and the Chemistry of  
Deception



Sharon Lerner

Aug. 11 2015, 3:35 p.m.



133

Home

The New York Times Magazine

## The Lawyer Who Became DuPont's Worst Nightmare

Rob Bilott was a corporate defense attorney for eight years. Then he took on an environmental suit that would upend his entire career — and expose a brazen, decades-long history of chemical pollution.

By NATHANIEL RICH JAN. 6, 2016





# PFAS Legal Claims

September 2015: 3,500 personal injury and 37 wrongful death claims in Ohio Valley against DuPont went to trial

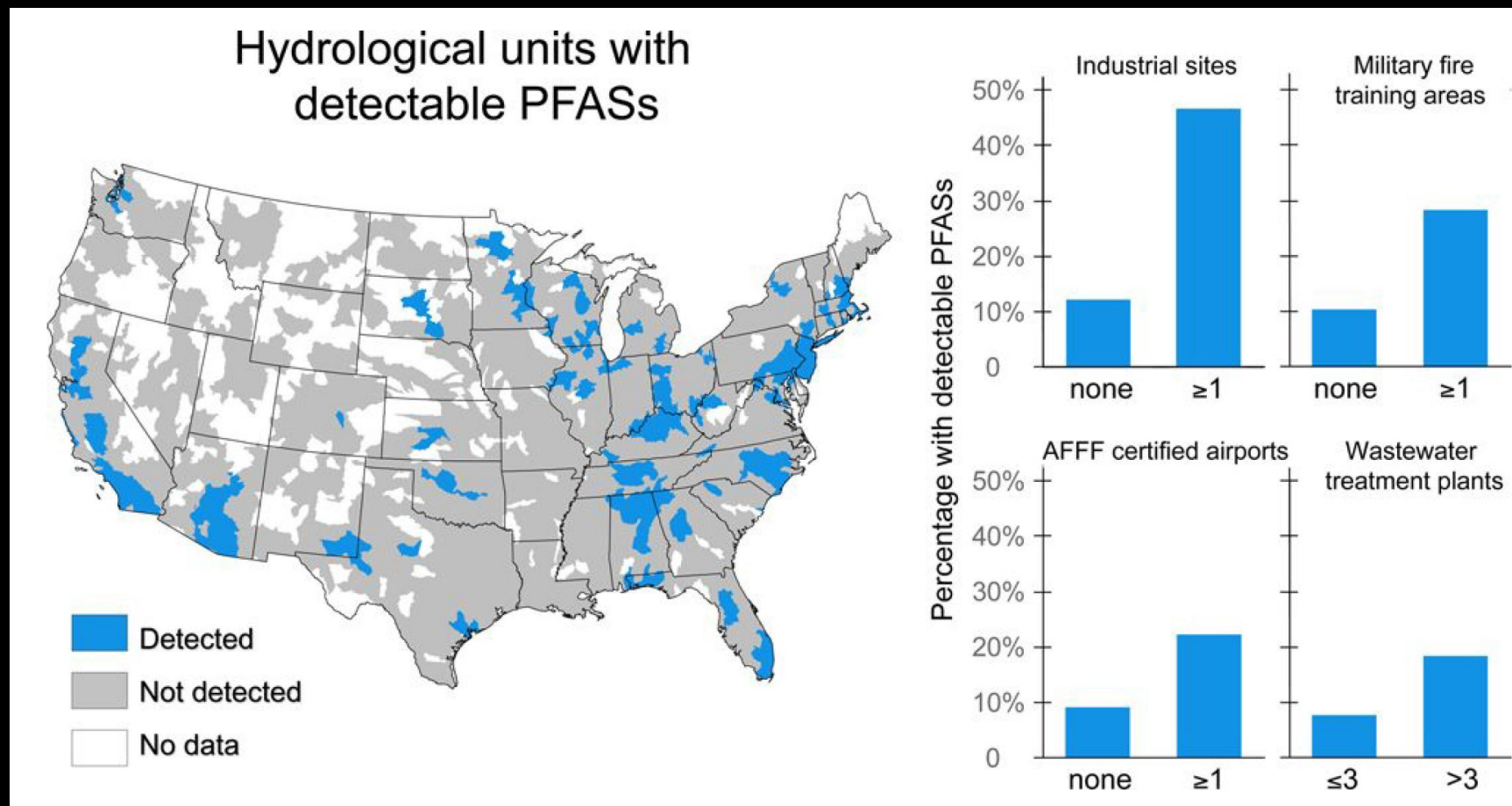
*(The Teflon Toxin Goes to Court, Sharon Lerner, The Intercept)*

February 2017: \$671 million to settle claims

Minnesota seeks \$5 billion for PFAS water pollution

February 2018: 3M, Minnesota settle for \$850 million

# EPA Lifetime Health Advisory Level of 70 ng/L PFOA + PFOS



# Highly Fluorinated Hush Puppies

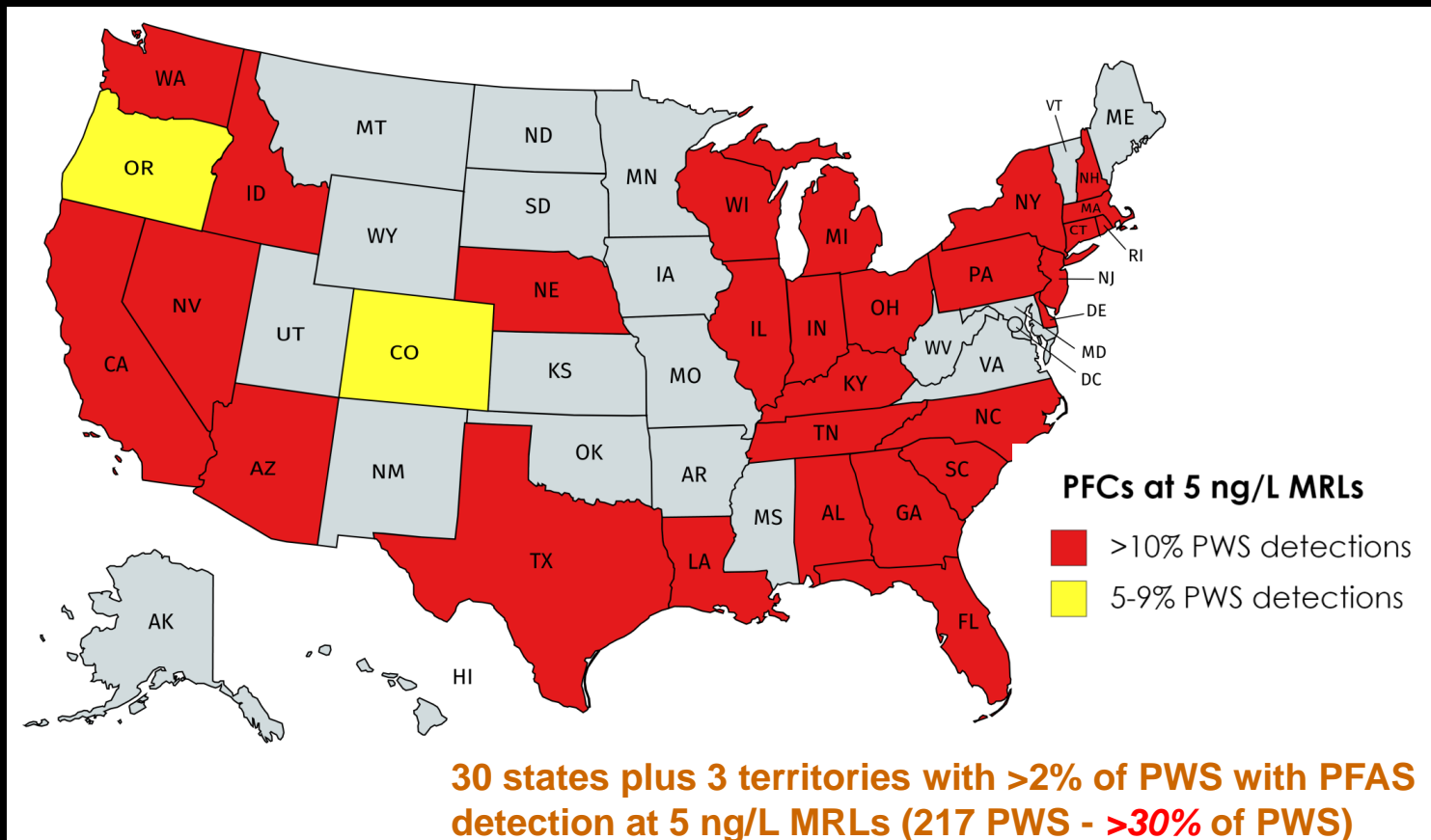
- Wolverine used Scotchguard (PFOS) used for leather treatment 1950s
  - Leather scrap dumped
  - Sludge applied to fields
- PFOA + PFOS level up to 58,000 ppt  
( 842 times EPA health advisory level)





# Widespread PFAS occurrence

- Percent of water systems with detectable PFOA:
  - Official EPA estimate: 1%
  - **Estimate from testing lab: up to 24%**



# CA proposal to list carpets with any PFAS

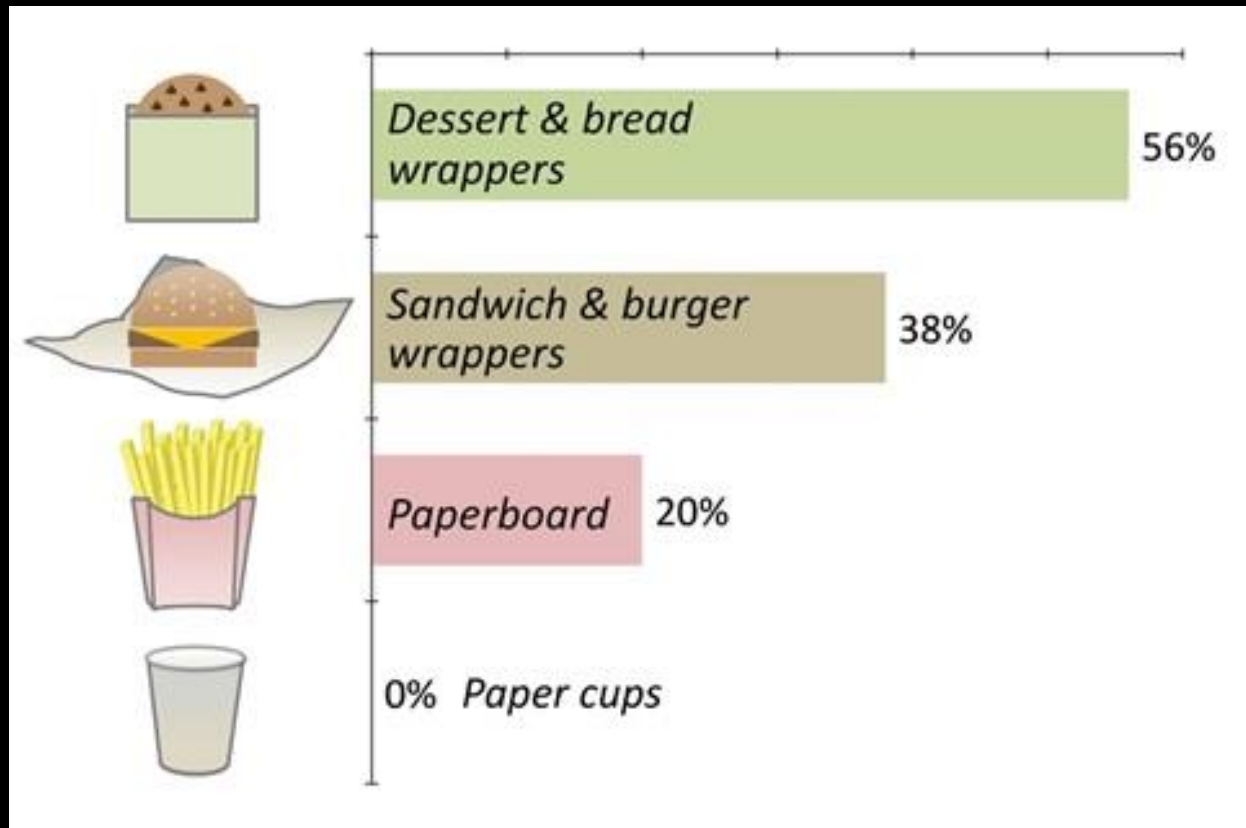
February 15, 2018



The CA Department of Toxic Substances Control is proposing to list carpets & rugs containing **any PFAS** as priority products for regulation.

# Fluorine in U.S. fast food packaging paper

(percent positive; 400 products sampled)



Adopted from Schaider L. 2017 *Fluorinated compounds in U.S. fast food packaging*.



# Impact



## United States Senate WASHINGTON, DC 20510

March 9, 2017

Mr. Daniel S. Schwartz  
Chief Executive Officer  
Restaurant Brands International Inc.  
226 Wycroft Road,  
Oakville, Ontario L6K 3X7,  
Canada

Dear Mr. Schwartz:

We write to inquire about Burger King's use of potentially harmful fluorinated chemicals in food wrappers, bags, boxes, or other kinds of food packaging. Per and polyfluoroalkyl substances (PFASs) represent a class of chemicals sometimes used in fast food packaging to prevent grease and sauces from seeping through packaging. These chemical compounds have been

# New York State purchasing ban on PFAS



single use food containers & packaging

"...products purchased ...on State contracts shall not contain perfluorinated chemicals (PFCs)..."



# Washington State's Healthy Food Packaging Act signed March 21, 2018



HB 2658/SB 6396 passes  
House on a 30-17 vote

Bans paper food packaging  
containing any PFAS

## BRANDS ARE ELIMINATING HIGHLY FLUORINATED CHEMICALS

IKEA

H&M

Crate&Barrel

LEVI STRAUSS & CO.

PUMA

benetton

ESPRIT

adidas

MARKS &  
SPENCER

MANGO

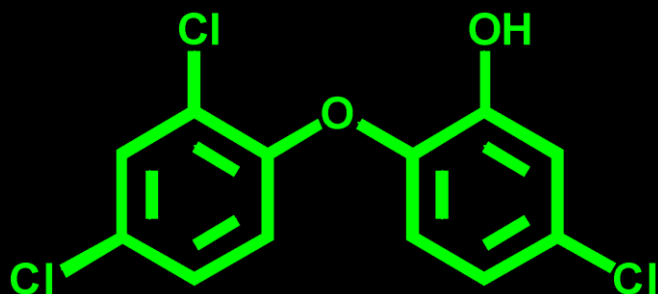
BURBERRY<sup>®</sup>  
LONDON

ZARA

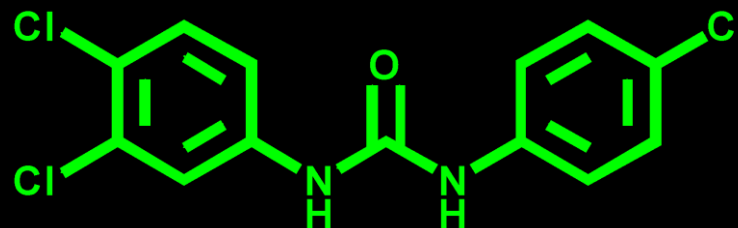


# Class 2: Antimicrobials

Triclosan

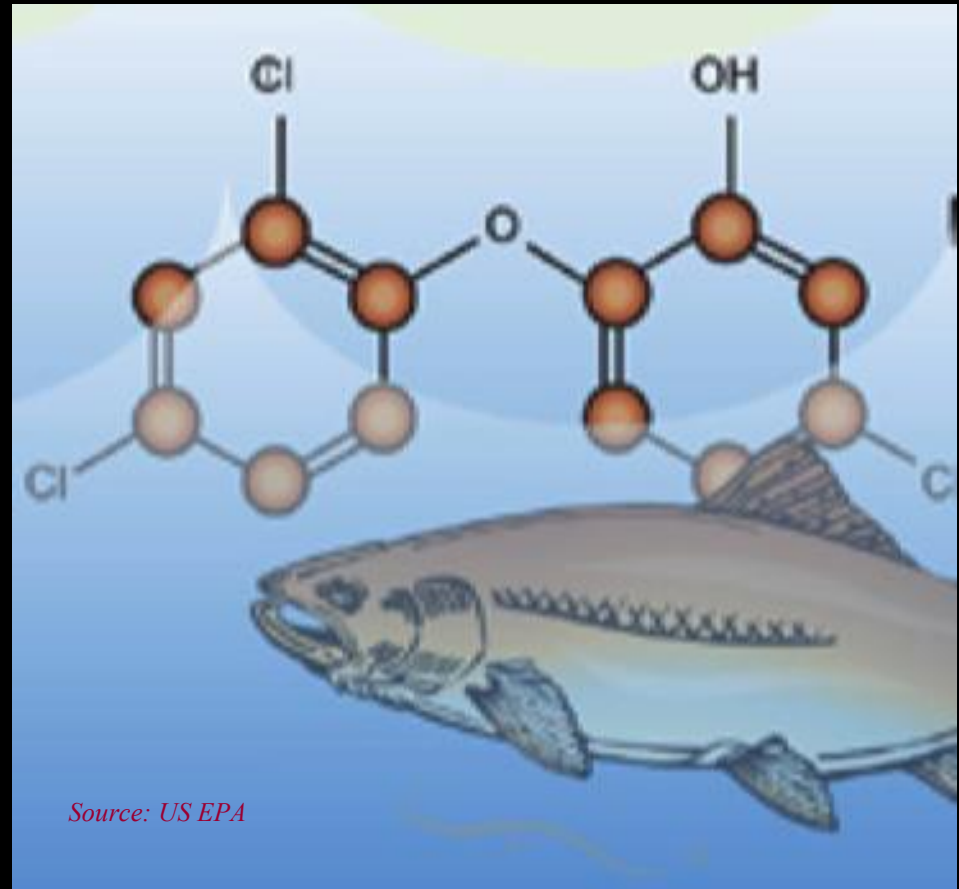


Triclocarban

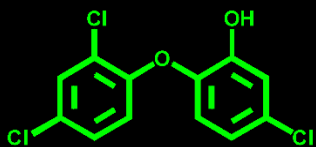




**5 – 10 Seconds**  
(ineffective)



Lifetime exposure in  
aquatic organisms  
(toxic)



FDA Draft  
Monograph  
on lack of efficacy  
and safety

First  
detection  
in fish

FDA removes  
assorted  
antimicrobials from  
drug category

Patented

1964

1974

1984

1994

## A History of Triclosan in the U.S.

2002

Top ten water  
contaminant

2007

Endocrine  
disruptor;  
Detectable in  
97% of breast  
milk samples

2016

FDA determines 19  
antimicrobials not  
safe or effective in  
consumer soaps

2013

> 2,000  
antimicrobial  
products.

2010

NGOs petitions  
FDA to prohibit  
triclosan in soaps.  
NGO sues FDA.

# The Florence Statement on Triclosan and Triclocarban



Documents the scientific consensus about:

- potential for harm
- recommendations to prevent further harm

Signed by 205 international scientists



# Alternative Antimicrobials

	Toxic to Aquatic Organisms	Can Persist in the Environment	Can Contribute to Antimicrobial Resistance	Health Risks?
Triclosan & Triclocarban	✓	✓	✓	Hormone disruption Allergy sensitivity Altered microbiome
Quats	✓	✓	✓	Asthma Skin irritation Reproductive toxicant?
Nanosilver	✓	✓	✓	Significant data gaps

# Class 3 Flame retardants

## Updating 1970s Flammability Standards

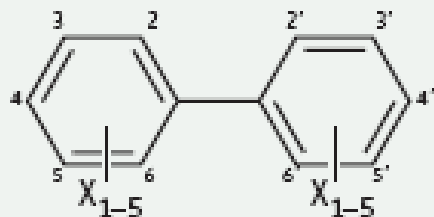
- Children's sleepwear --1976
- Furniture and baby product foam --2014
- Foam building insulation --2019?

# Technical Bulletin 117

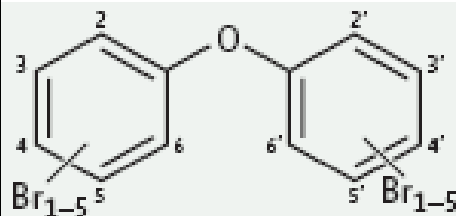


- Required furniture foam to withstand a small open flame for 12 seconds
- No significant fire safety benefit (fires start in exterior fabric not filling)

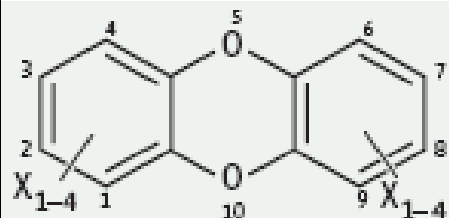
# PentaBDE Flame Retardant



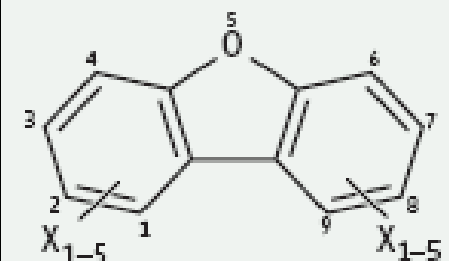
PCBs (X = Cl) and PBBs (X = Br)



PBDEs



Dioxins (X = Cl or Br)



Furans (X = Cl or Br)

Used from 1975 to 2004  
to meet TB117.

98% of use in foam in US  
and Canada in 2003



# Furniture foam flame retardant (PentaBDE) associations with human health problems



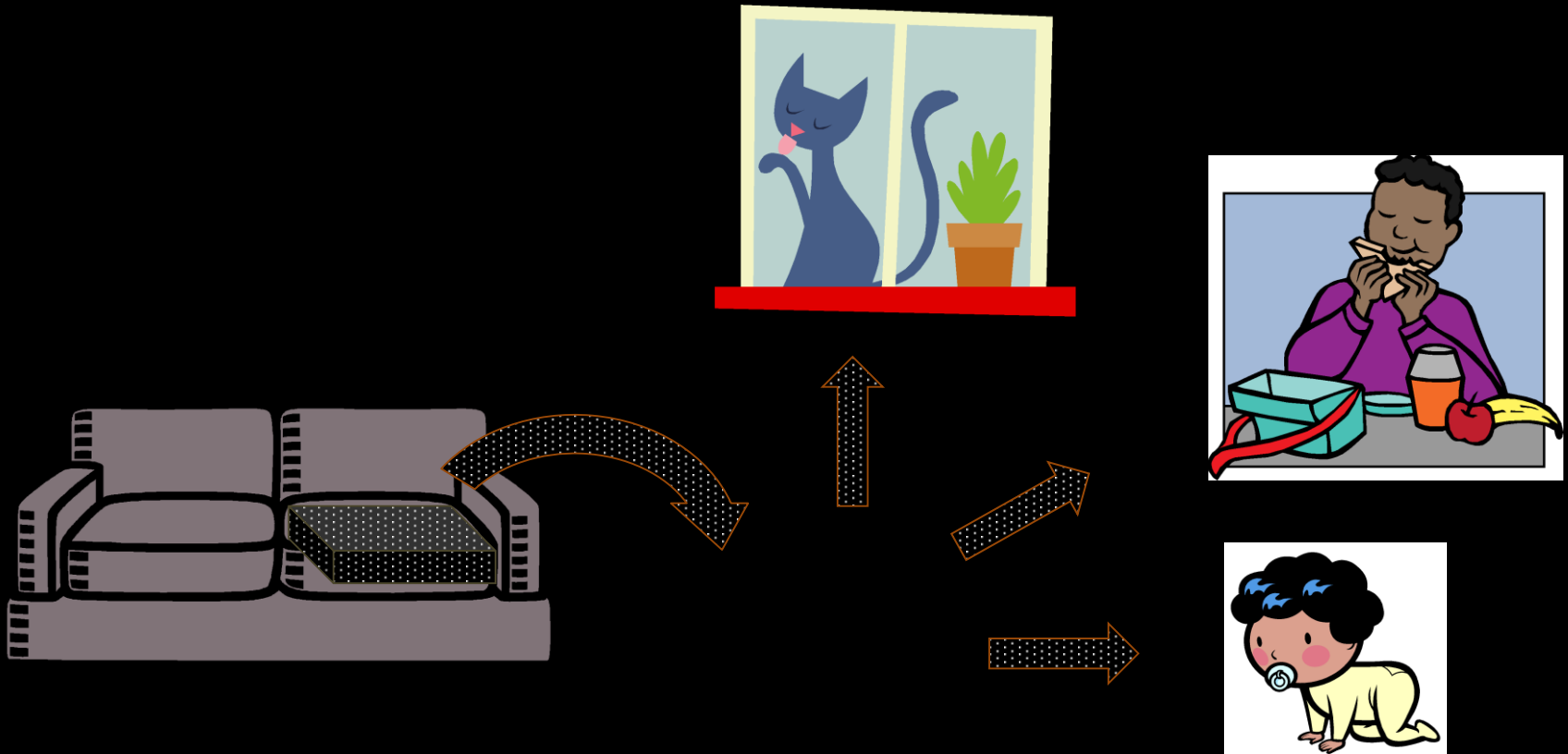
Increased time to pregnancy  
Altered thyroid hormone  
Thyroid disease in women



Impaired attention  
Poorer coordination  
Lower IQ  
Developmental toxicity  
Baby boys' genital problems  
Lower birth weight  
Delayed puberty in girls  
Earlier puberty in boys

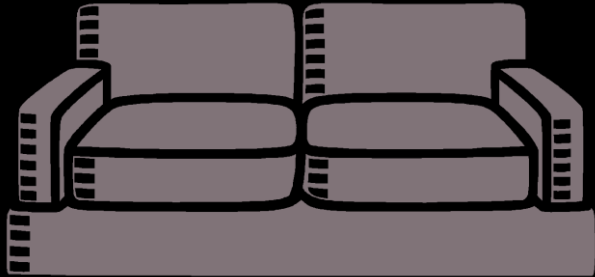
*Main et al. 2007; Goodyer et al 2017;  
Eskenazi et al., 2010, 2011, 2012; Herbstman et  
al. 2010; Makey et al. 2016; Windham et al.  
2015; Harley et al. 2017; Allen et al. 2016*

# From Products to People



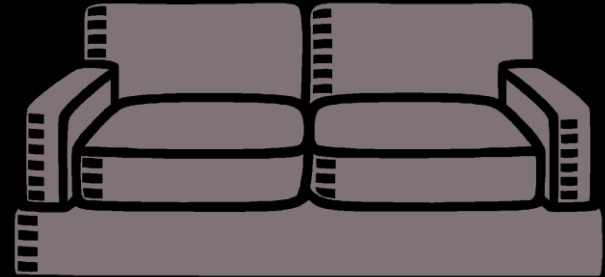
# TB117 Fire Safety Benefit?

TB117 foam



~

Non - TB117 foam



“No significant, consistent difference...”

# Flame retardants increase smoke toxicity more than they reduce fire growth

Flame retardants delay, but don't prevent ignition  
Then, flame retardants can increase....



- Soot and Smoke
- Carbon Monoxide and Hydrogen Cyanide
- Dioxins and Furans



# Increased fire safety without flame retardants



Assembly Bill 706, Senate Bill 772, Senate Bill 1291, Senate Bill 147

**A DEADLY MISTAKE**

Help stop the bill that will ban material used to make flame resistant products.

CALL YOUR STATE SENATOR TODAY AND TELL THEM TO  
**VOTE NO ON AB 706**

Call State Senator  
**Tom Torlakson**  
at **916-651-4007** and tell him to  
**VOTE NO** on AB 706.

P-15 P25 \*\*\*\*\*ECRLOT\*\*C018

Richmond, CA 94804-5339

Presorted Standard  
U.S. Postage  
PAID  
Rancho Cordova, CA  
Permit #275

**DON'T LET THE SACRAMENTO POLITICIANS BAN THE USE OF  
PROVEN FLAME RETARDANTS-IT COULD BE A DEADLY MISTAKE**

## Paid for by Californians for Fire Safety:

- Albemarle
- Chemtura
- Israel Chemicals LTD (ICL)

# San Antonio Statement on Brominated and Chlorinated Flame Retardants

- Signed by over 200 scientist's from 30 countries
- Documents health and environmental harm and lack of proven fire safety benefit





## Elimination of Fire Retardant Chemicals in Office Furniture

“Given the increasing body of evidence that indicates the persistence, bio-accumulation and potential health aspects of many fire retardants, we believe the risks associated with the use of these chemicals is greater than the hazard associated with the fire risk from furniture without fire retardants.”

- From the position paper

Business and Institutional Furniture Manufacturer's Association. (BIFMA)



Pulitzer Prize

Finalist

Goldsmith Prize

Investigative Reporting

Environmental

Journalists Society

Environmental Reporting

Gerald Loeb Award

Business and Financial Journalism

National Press Club

Consumer Award

# Chicago Tribune



QUESTIONS? CALL 1-800-TRIBUNE

SUNDAY, MAY 6, 2012

BREAKING NEWS AT CHICAGOTRIBUNE.COM

TRIBUNE WATCHDOG

## Playing with fire

A deceptive campaign by industry brought toxic flame retardants into our homes and into our bodies. And the chemicals don't even work as promised.

By PATRICIA CALLAHAN AND SAM ROE  
Tribune reporters

**D**r. David Heimbach knows how to tell a story. Before California lawmakers last year, the noted burn surgeon drew gasps from the crowd as he described a 7-week-old baby girl who was burned in a fire started by a candle while she lay on a pillow that lacked flame retardant chemicals.

"Now this is a tiny little person, no bigger than my Italian greyhound at home," said Heimbach, gesturing to approximate the baby's size. "Half of her body was severely burned. She ultimately died after about three weeks of pain and misery in the hospital."

Heimbach's passionate testimony about the baby's death made the long-term health concerns about flame retardants voiced by doctors, environmentalists and even firefighters sound abstract and petty.

But there was a problem with his testimony: It wasn't true. Records show there was no dangerous pillow or candle fire. The baby he described didn't exist.

Neither did the 9-week-old patient who Heimbach told California legislators died in a candle fire in 2009. Nor did the 6-week-old patient who he told Alaska lawmakers was fatally burned in her crib in 2010.

Heimbach is not just a prominent burn doctor. He is a star witness for the manufacturers of flame retardants.

His testimony, the Tribune found, is part of a decades-long campaign of deception that has loaded the furniture and electronics in American homes with pounds of toxic chemicals linked to cancer, neurological deficits, developmental problems and impaired fertility.

The tactics started with Big Tobacco, which wanted to shift focus away from cigarettes as the cause of fire deaths, and continued as chemical companies worked to preserve a lucrative market for their products, according to a Tribune review of thousands of government, scientific and internal industry

stoked the public's fear of fire and helped organize and steer an association of top fire officials that spent more than a decade campaigning for their cause.

Today, scientists know that some flame retardants escape from household products and settle in dust. That's why toddlers, who play on the floor and put things in their mouths, generally have far higher levels of these chemicals in their bodies than their parents.

Blood levels of certain widely used flame retardants doubled in adults every two to five years between 1970 and 2004. More recent studies show levels haven't declined in the U.S. even though some of the chemicals have been pulled from the market. A typical American baby is born with the highest recorded concentrations of flame retardants among infants in the world.

People might be willing to accept the health risks if the



# California Flammability Standards TB117-2013

Mandatory January 1, 2015

Flame retardants not needed,  
but can still be used

Product Labels Required

TB133 being revoked in California  
due to lack of need and potential  
for harm

## NOTICE

THIS ARTICLE MEETS THE FLAMMABILITY REQUIREMENTS OF CALIFORNIA BUREAU OF ELECTRONIC AND APPLIANCE REPAIR, HOME FURNISHINGS AND THERMAL INSULATION TECHNICAL BULLETIN 117-2013. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.

The upholstery materials in this product:

☐ contain added flame retardant chemicals  
☒ contain NO added flame retardant chemicals

The State of California has updated the flammability standard and determined the fire safety requirements for this product can be met without adding flame retardant chemicals. The State has identified many flame retardant chemicals as being known to, or strongly suspected of, adversely impacting human health or development.

# NFPA 277 would reintroduce an open-flame standard in residential upholstered furniture

- A new furniture flammability test is not needed.
- NFPA 277 would not significantly improve fire safety, but would harm our health and environment.
- NFPA process lacked transparency & was industry dominated.
- Next meeting: March 2018



If passed, NFPA 277 could bring toxic & unneeded  
flame retardants back into US, Canadian furniture!

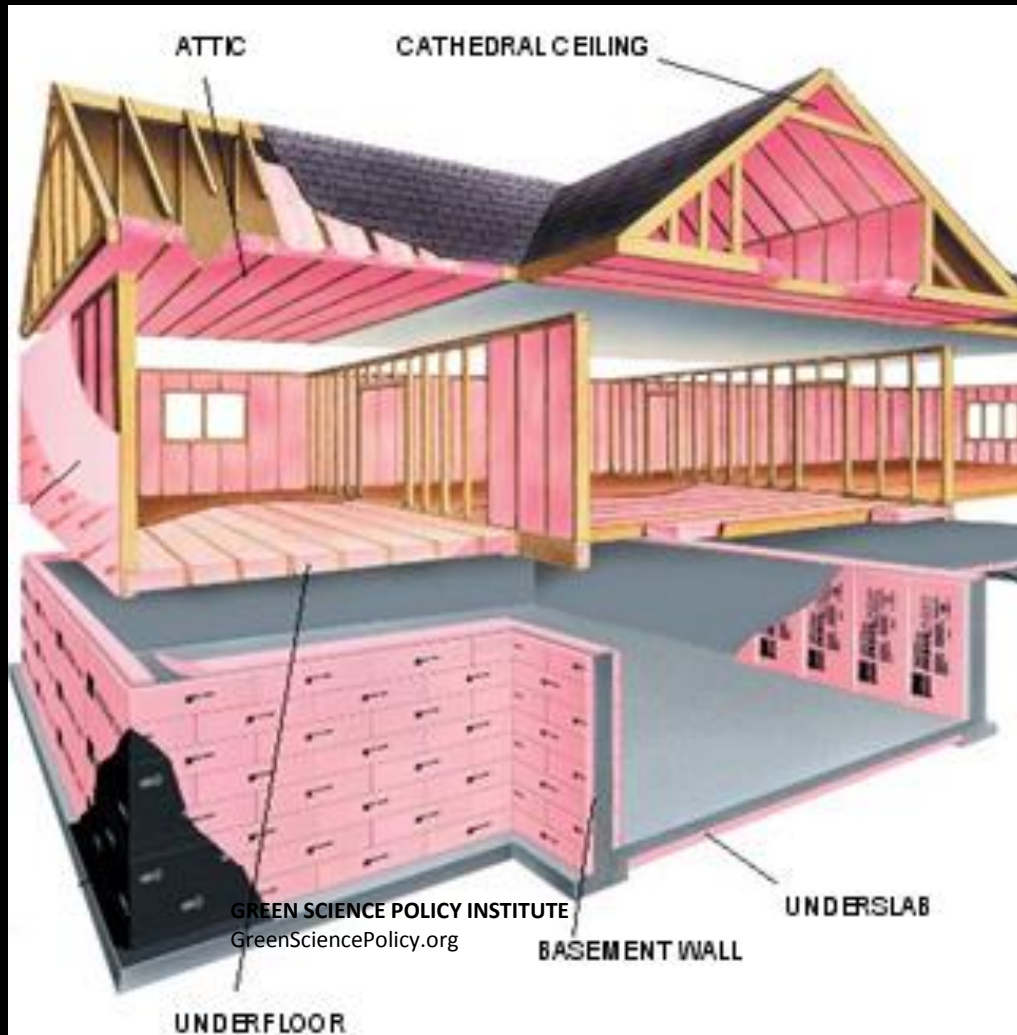
# Proposed Canadian open flame standard CAN/ULC-S131-YY

Standard method of tests for fire growth flammability  
of upholstered furniture  
Under Underwriters Laboratory





# Plastic foam insulations (polystyrene, polyurethane, polyiso, etc.)



Used increasingly for  
energy efficiency

Can be used:

- inside walls
- below grade
- attics, etc.



# Building codes drive use of FRs in insulation



BUILDING RESEARCH & INFORMATION (2012) 40(6), 738–755



## INFORMATION PAPER

### Flame retardants in building insulation: a case for re-evaluating building codes

Vytenis Babrauskas<sup>1</sup>, Donald Lucas<sup>2</sup>, David Eisenberg<sup>3</sup>, Veena Singla<sup>4</sup>,  
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<sup>5</sup>Department of Chemistry, University of California, Berkeley, CA 94720, US

# Assembly Bill 127 (2013): Safer Building Insulation

- State fire marshal may propose updates that:
  - Maintain overall fire safety
  - Provide flexibility in meeting fire safety standards with or without chemical flame retardants
- Implementation:
  - Working Group (ended summer 2015)
  - Testing & analysis at Oklahoma State University

# Oklahoma State University Study

Commissioned by California OSFM following AB 127 Working Group.

## Key Findings

- Comparable ignition and heat release rates between foam plastic insulation with and without flame retardants and other combustible construction materials .
- When installed below grade, no risk of fire spread to the structure from insulation without flame retardants.

California codes can be safely updated to allow below-grade use of insulation without flame retardants.

# Six Classes Videos

An innovative approach to reducing toxics

1

Highly  
Fluorinated

2

Antimicrobials

3

Flame  
Retardants

4

Bisphenols  
+ Phthalates

5

Some  
Solvents

6

Certain Metals



**VIEW and SHARE: [www.SixClasses.org](http://www.SixClasses.org)**

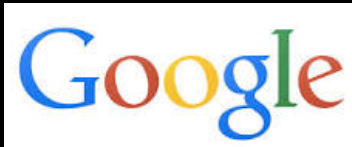
Healthier products, healthier people in four minutes!

# Purchasers are Key


- Manufacturers of consumer products
- Large retailers
- Educational, institutional & governmental
- Designers and specifiers
- Consumers



# Material Buyer's Club



- Require transparency from manufacturers
- Utilize collective purchasing power to create a demand for healthier products and materials

A high-altitude mountain peak, likely snow-capped, with a climber visible on the slope. The sun is shining brightly in the upper left corner, creating a lens flare effect. The sky is a deep blue.

For monthly e-newsletters,  
give Arlene your card or  
sign our mailing list

**This talk will be  
under Past Events at  
[www.GreenSciencePolicy.org](http://www.GreenSciencePolicy.org)**



A scenic mountain landscape. In the foreground, a dirt path winds through a field of green grass and vibrant red wildflowers. The middle ground shows rolling green hills and a dense forest of evergreen trees. In the background, a large, snow-capped mountain peak rises above a layer of white clouds under a clear blue sky.

**By limiting use of the Six Classes**

**We can have a healthier world.**

**For more information:  
[GreenSciencePolicy.org](http://GreenSciencePolicy.org)**