Reducing Harm from PFAS
For Health & Environment

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February 4, 2022
Convene businesses, government, NGOs, academic scientists

Scientific Research

Communicate

Government Policy & Business Purchasing Change
MORE THAN 80,000+ CHEMICALS ARE ON THE MARKET TODAY
EVALUATING TENS OF THOUSANDS OF INDIVIDUAL CHEMICALS IS UNWORKABLE
But addressing six groups of chemicals of concern is manageable.
Six Classes Videos

PFAS 1  Anti-microbials 2  Flame Retardants 3  Bisphenols + Phthalates 4  Some Solvents 5  Certain Metals 6

www.SixClasses.org
Healthier products, healthier people in four minutes!
Is it necessary?

Is it worth it?

Is there a safer alternative?
Class 1 PFAS
(Per- and polyfluoroalkyl substances)

PFOA (C8)

PFOS (C8)

Carbon-Fluorine bond strength:
- Leads to oil and water repellency
- “Forever chemicals” — last for geologic time!
PFAS: Multi-System Toxicants

Thyroid

Immune

Liver

Pancreas

Kidney

Cancer

Reproductive Organs

Neuro-developmental

Courtesy, Dr. Linda Birnbaum, Modified from ATSDR, 2018
Wide Range of Possible Health Harms

PFOS and/or PFOA

- Testicular cancer
- Kidney cancer
- Prostate cancer
- Ovarian cancer
- Obesity
- Hormonal changes
- Thyroid disruption
- Delayed puberty, decreased fertility, early menopause
- Reduced testosterone

- Pregnancy-induced hypertension
- Lower birth weight & size
- Liver malfunction
- High cholesterol
- Ulcerative colitis
- Immunotoxicity, including interference with child & adult vaccine response

Courtesy, Dr. Linda Birnbaum
PFAS are in nearly all of us

Detectable serum PFAS

Non-detectable

Courtesy: Cindy Hu, Harvard University
EPA Lifetime Health Advisory Level:
70 ng/L PFOA + PFOS

Cindy Hu et al, ES&T Letters, 2016
Drinking Water Health Guidelines for PFOA (parts per trillion)

**DuPont**
- 1987: 5000
- 1991: 1000

**U.S. EPA**
- 2009: 400

**U.S. EPA**
- 2016: MN 35
- 2017: VT < 20
- 2019: MA: < 20
- 2019: MI: 8
- 2019: NH: 12
- 2019: NJ: 14
- 2019: NY: 10
- 2020: CA: 0.007*
- 2020: WA: 10

*Draft public health goal*
Decabromodiphenyl ethane

Long chain:
• Extreme persistence
• Bioaccumulation
• Toxicity

Short chain:
• Extreme persistence
• Less bioaccumulation in humans
• Build-up in plants
• Suspected toxicity
• More mobile
• Clean up more difficult
• Harder to measure & monitor

"Regrettable" Substitution?
Contamination in New Mexico

- Cannon Air Force Base
  - Firefighting foam entered groundwater
  - PFAS migrated from base to dairy wells to cows to milk

- PFOS level up to 12,000 ppt
  - 171 times EPA health advisory level!
PFAS Spill in Michigan

• Wolverine treated leather with Scotchguard (PFOS)
  • Leather scrap dumped
  • Sludge applied to fields

• PFOA + PFOS up to 58,000 ppt
  842 times EPA health advisory level!

• Wolverine to pay Michigan $69.5 million
• 3M to pay Wolverine $55 million
Water Treatment Costs: North Carolina

Brunswick County: reverse osmosis filtration for 25,000 customers:
- $99M to build
- $2.9M to operate

Cape Fear Public Utility Authority activated carbon filtration plant:
- $46M to build
- $2.7M to operate each year
PFAS are Problematic & Difficult to Clean Up

Prevention is Preferable!
Fluorinated Compounds in U.S. Fast Food Packaging

Laurel A. Schaides, Simona A. Balan, Arlene Blum, David Q. Andrews, Mark J. Strynar, Margaret E. Dickinson, David M. Lunderberg, John R. Lang, and Graham F. Peaslee

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Supporting Information

ABSTRACT: Per- and polyfluoroalkyl substances (PFASs) are highly persistent synthetic chemicals, some of which have been associated with cancer, developmental toxicity, immunotoxicity, and other health effects. PFASs in grease-resistant food packaging can leach into food and increase dietary exposure. We collected ~400 samples of food contact papers, cardboard containers, and beverage containers from fast food restaurants throughout the United States and measured total fluorine using particle-induced γ-ray emission (PIGE) spectroscopy. PIGE can rapidly and inexpensively measure total fluorine in solid-phase samples. We found that 46% of food contact papers and 20% of paperboard samples contained detectable fluorine (>16 nmol/cm²). Liquid chromatography/high-resolution mass spectrometry analysis of a subset of 20 samples found perfluorocarboxylates, perfluorosulfonates, and other known PFASs and/or unidentified polyfluorinated compounds (based on nontargeted analysis). The total peak area for PFASs was higher in 70% of samples (10 of 14) with a total fluorine level of >200 nmol/cm² compared to six samples with a total fluorine level of <16 nmol/cm². Samples with high total fluorine levels but low levels of measured PFASs may contain volatile PFASs, PFAS polymers, newer replacement PFASs, or other fluorinated compounds. The prevalence of fluorinated chemicals in fast food packaging demonstrates their potentially significant contribution to dietary PFAS exposure and environmental contamination during production and disposal.
United States Senate
WASHINGTON, DC 20510

March 9, 2017

Mr. Daniel S. Schwartz
Chief Executive Officer
Restaurant Brands International Inc.
226 Wyecroft 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

PFAS and Carpet

- PFAS-treated carpet linked to high PFAS blood levels
Major manufacturers phased out PFAS from carpets & rugs by January 1, 2020

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Home Depot plans to phase out selling rugs and carpets containing PFAS

By VIRGINIA GORDAN • SEP 17, 2019

The Home Depot announced Tuesday that it will stop buying from its suppliers any rugs and carpets that contain PFAS chemicals.

"Excluding PFAS from the carpets and rugs we sell is another example of our shared commitment to building a better future for our customers and the planet;"

Ron Jarvis, The Home Depot’s vice president for environmental innovation, said in a written statement.
Keen’s PFAS-Free Journey

• PFAS found to 101 places in Keen shoes
• 70 place PFAS were not necessary and removed
• Years of work to find replacements for other 31
• Success!

Do we need it?
67% REDUCTION
Precautionary Principle

GREEN SCIENCE POLICY INSTITUTE
www.GreenSciencePolicy.org
Fluorinated compounds in North American cosmetics
California Regulation on PFAS

- PFAS in paper food packaging (AB 1200)
- Disclosure of toxic chemicals in cookware (AB 1200)
- PFAS in firefighting foam, in most cases (SB 1044)
- Personal care products, some PFAS (AB 2762)
- Certain juvenile products (AB 652)
- Recyclable & compostable materials (AB 1201)
Moving away from PFAS
Cosmetics and Personal Care Products

Retailers:

- Credo (all products, policy)
- H&M (all store brand products, policy)
- Sephora (Clean at Sephora products, policy)
- Whole Foods Market (all products, policy)

Manufacturers:

- Annmarie Skin Care (all products, policy)
- California Baby (all products, policy)
- Hawk Tools (all products, policy)
- Otter Wax (all body and skincare products, policy)
- type: A Deodorant (all products, policy)
For monthly e-newsletters: SixClasses.org/Newsletter

Questions:
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By stopping the use of the PFAS, we can have a healthier world.

GreenSciencePolicy.org
Six Classes.org
ArleneBlum.com