



HASSENFELD  
CHILDREN'S  
HOSPITAL  
OF NEW YORK  
AT NYU LANGONE

# 病気が増える 肥満が増える 貧困が増える : 内分泌かく乱化学物質による健康・未来への緊急な脅威 私たちに何ができるか？

Sicker, Fatter, Poorer: The Urgent Threat of Hormone-Disrupting Chemicals to Our Health and Future . . . and What We Can Do About It

レオナルド・トラサンデ

Leonardo Trasande, MD, MPP

Jim G. Hendrick, MD Professor of Pediatrics

Vice Chair for Pediatrics and Director, Division of Environmental Pediatrics

Professor of Environmental Medicine and Population Health

NYU School of Medicine

**NEW POLYTHENE TUMBLERS** offer the housewife timely convenience for bathroom or kitchen. Their resilience is seen in inset photograph: as soon as pressure is removed, they spring back into shape. Tumblers molded by Tupper Plastics, Inc., Farmington, Mass.



**TUMBLERS THAT MAKE LIGHT OF A HEAVY FOOT**  
*Made of Du Pont polythene . . . they're unbreakable!*

**CHOOSE YOUR COLOR!**  
 Polythene molding powder is made in a wide range of attractive colors. For tumblers, as for many other products, select colors to make the finished product more salable.

Another new product from a Du Pont plastic! These household tumblers are also light, tasteless, odorless, good-looking—just what the housewife has been looking for, for years.

An alert manufacturer saw in the unrivaled properties of Du Pont polythene just the combination for the product he had planned. The specific gravity of polythene is 0.92. It floats on water! Polythene is chemically inert, flexible, and has outstanding electrical properties too. Other manufacturers are using many of these properties to advantage in products as diverse as refrigerator bowl covers, insulation for television cables and—baby pants.

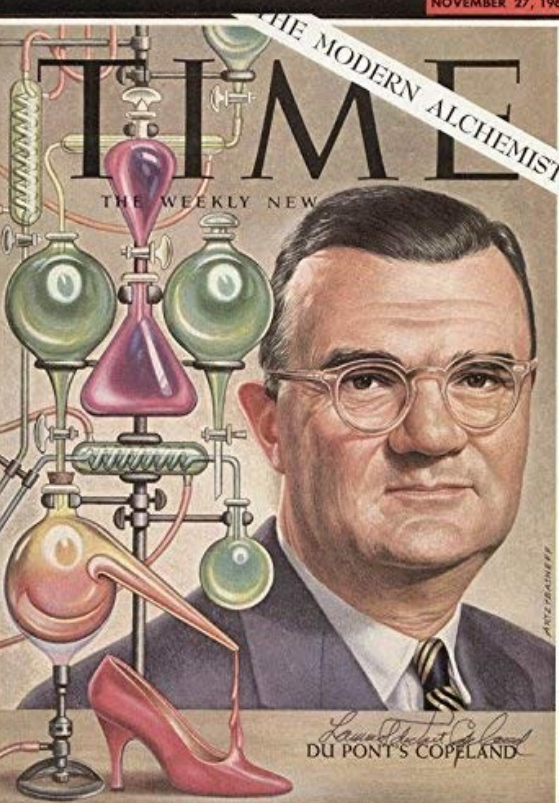
Right now the demand for polythene exceeds the supply, but increased production facilities will be completed as soon as possible. Literature and samples for evaluation are available now. E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Room 5810, Arlington, New Jersey.



NOVEMBER 27, 1964

**THE MODERN ALCHEMIST**

**TIME**  
 THE WEEKLY NEW



*E. I. du Pont de Nemours & Co. (Inc.)*  
**DU PONT'S COPELAND**

39



**HE'S SAFE . . . HE'S IN SIGHT . . . HE'S IN "LUCITE"**

No drafts reach this baby! Yet his nurse can always see him. He's safer, that's sure, than the infant surrounded by blankets in the old-style bassinet.

For filling this long-standing hospital need, credit the man who discovered that this transparent, sanitary "baby-busket" could be formed from a single sheet of Du Pont "Lucite." The light-weight of "Lucite" acrylic resin makes the product easy to handle . . . its strength helps make it last for years.

Thus another new and better product steps into a market ready and waiting . . . because of a man-with-an-idea who knew his Du Pont plastics.

Just so, in many fields new products are made more beautiful, more serviceable, more salable by one or more of the Du Pont plastics. These all help to show that the manufacturer who knows these plastics will have a big head start over the man who doesn't. Write for literature on these plastics today. E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Room 585, Arlington, N. J.

*The "Infantus" is made by W. P. Campbell Mfg. Co., Los Angeles, Cal., for American Hospital Supply Corp., Chicago, Ill.*



**WHAT'S NEW**  
 Tumblers of molded Lucite are translucent, light-weight, attractive and pleasant to the touch, yet they stand hard knocks, hot dishes—and steam-ironing! Dropped on concrete terraces or that bathroom floor, they do not break. Manufactured by the Ilex Plastics, Buffalo, N. Y.



<http://www.fulltable.com/VTSP/plast/duPont/a.htm>;  
<https://www.amazon.com/Lammot-Dupont-Copeland-Magazine-Signed/dp/B01N3191JZ>



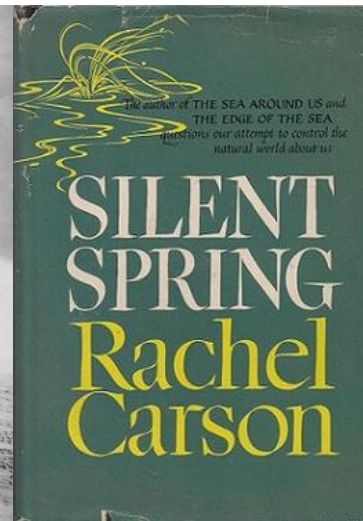
A Warning From Wildlife

## 野生生物からの警告

Rachel Carson became concerned about the use of synthetic pesticides in the mid-1940s

レイチェル・カーソンは、1940年代中頃に合成農薬の使用に関心を持つようになった

- Scientist in US Fish & Wildlife Service
- 米国魚類野生生物局の科学者





## A Warning From Our Children

# 子ども達からの警告

Diethylstilbestrol (DES), a synthetic estrogen prescribed to pregnant women beginning in 1938 to prevent miscarriage

ジェチルスチルベストロール（DES）－1938年以降、流産予防に妊婦に処方された合成エストロゲンの一種

- Use declined in 1950s as it was found to be ineffective
- 効果のないことがわかったため、1950年代に使用機会が減少

1960s: observation by Herbst et al of eight cases of clear cell adenocarcinoma of the vagina in girls who had been exposed in utero one to two decades earlier

1960年代：ヘルプストらが、10～20年前に子宮がDESに曝露した経験のある少女の腔明細胞腺癌8症例を観察

Herbst et al NEJM 1971

Medscape® www.medscape.com

*"Really?"*

Yes...  
**desPLEX**  
to prevent ABORTION, MISCARRIAGE and  
PREMATURE LABOR

*recommended for routine prophylaxis  
in ALL pregnancies...*

96 per cent live delivery with desPLEX  
in one series of 1200 patients\*—  
— bigger and stronger babies, too.<sup>1,2</sup>

No gastric or other side effects with desPLEX  
— in either high or low dosage.<sup>3,4,5</sup>

Source: J Midwifery Womens Health © 2003 Elsevier Science, Inc.

We thought we were safe again.

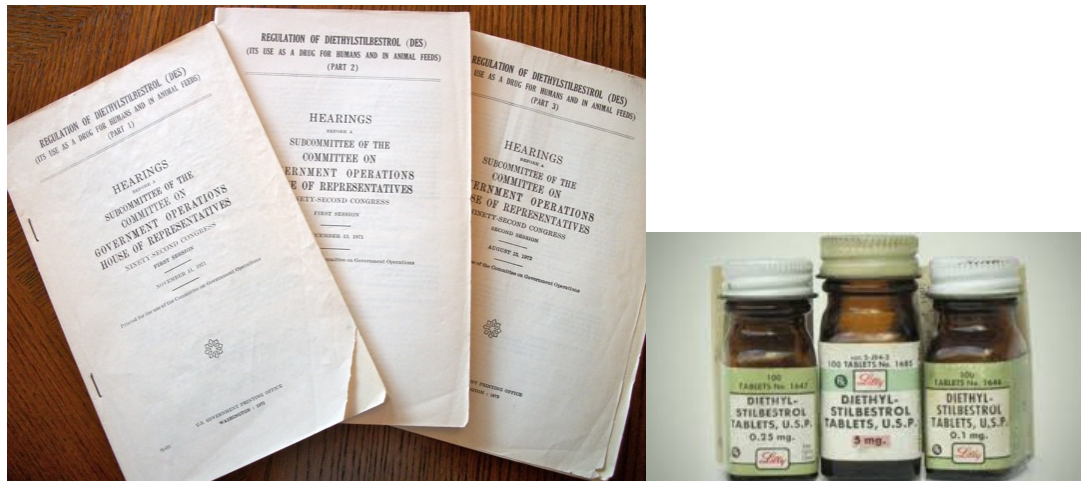
## 安全が取り戻されたと思われた

We banned DDT under the Stockholm Convention

ストックホルム条約によりDDTの使用を禁止

FDA banned DES in 1971

1971年にFDAがDESの使用を禁止



Why did we think we were safe?

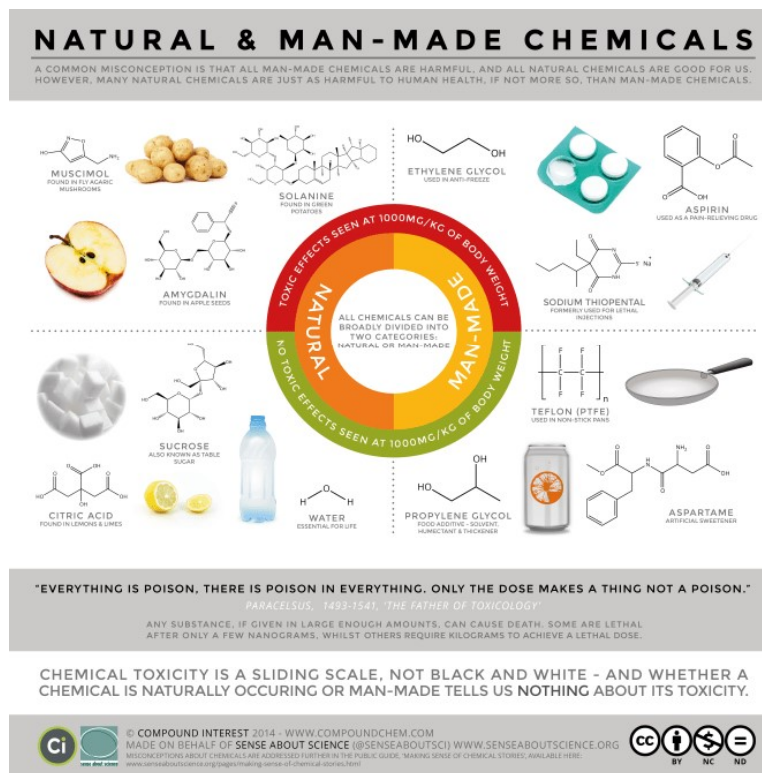
## なぜ安全が取り戻されたと思われたか？

“All things are poisons, for there is nothing without poisonous qualities. It is only the dose which makes a thing poison.”

「すべてのものは毒であり、毒性のないものなど存在しない。有毒かそうでないかを決めるのはその服用量である」

- ・ フィリップス・アウレオールス・テオフラストウス・ボンバストウス・フォン・ホーエンハイム (1493～1541)

Philippus Aureolus Theophrastus Bombastus von Hohenheimborn (1493–1541)



But we were not safe...

## しかし、安全ではなかった...

We previously thought organophosphate pesticides only affected electrical discharges in the brains of rodents, and that humans were less vulnerable.

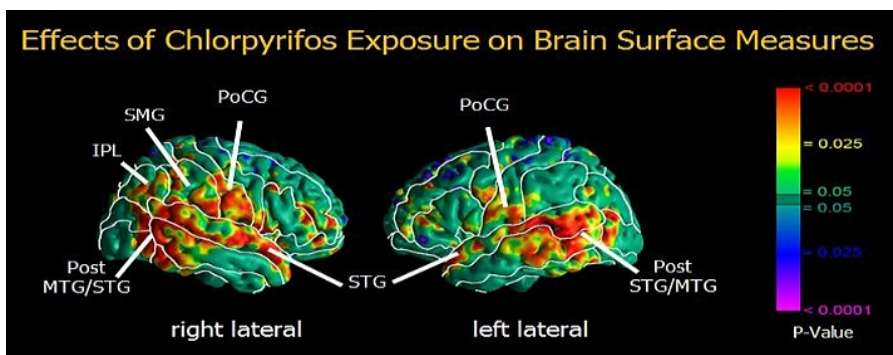
有機リン系農薬はげっ歯類の脳内放電にのみ作用し、ヒトにはさほど害がないと以前は考えられていた。

Now we know that these chemicals can affect thyroid hormone, which is crucial for brain development

しかし、有機リン系農薬は脳の発達において極めて重要な働きをする甲状腺ホルモンに作用する可能性のあることが今では知られている。

Highly exposed children have lower IQs and parts of the brain crucial for cognitive potential are smaller

この農薬に重度に曝露した子どもはそうでない子どもに比べてIQが低く、認知能力を司る脳の部分が萎縮している。



Plastics are making us fatter

## プラスチックが肥満化を促す

Bisphenol A, used in aluminum can linings, baby bottles and thermal paper receipts:

アルミ缶の内張り、哺乳瓶、感熱紙のレシートに使用されているビスフェノールAは...

- Makes fat cells bigger
- 脂肪細胞を肥大させる
- Disrupts function of a protein that protects the heart, adiponectin
- 心疾患を予防するタンパク質アディポネクチンの機能を阻害する
- Low-grade synthetic estrogen, and can have sex-specific effects on body mass during vulnerable windows of development such as puberty
- 低質合成エストロゲンであり、思春期などの不安定な発達段階で性特異的効果を体重に及ぼす可能性がある





Plastics are making us sicker

# プラスチックが体調を悪化させる

Phthalates used in softer plastics disrupt metabolism, shifting calories to sugar and fat, as opposed to protein

軟質プラスチックに使用されているフタル酸エステル類は、タンパク質とは対照的にカロリーを糖や脂肪に変えて代謝を阻害する

Disrupts the male sex hormone, crucial for sperm production and libido

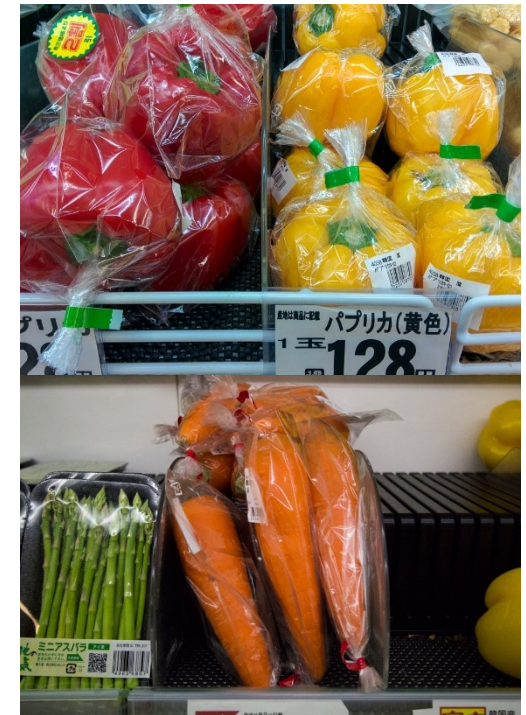
精子産生と性欲に重要な役割を果たしている男性ホルモンの働きを阻害する

- These effects are visible in newborn babies, with changes in the location of the genitals that predicts fertility in adult males
- こうした効果は新生児に顕在化し、成人後の生殖能力に問題が発生することが懸念されるような生殖器の位置の異常が起こる

Low testosterone is a marker for or predictor of adult cardiovascular disease in men

テストステロンの低下は、成人男子の心血管疾患のマーカ―や予知因子となる

- 10,000 US men 55-64 die each year as a result of phthalate-induced reductions in testosterone.
- 毎年55～64歳の米国人男性1万人が、フタル酸エステルに起因するテストステロンの減少により死亡している



Chemicals are making us poorer

# 化学物質が経済的負担を増大させている

Disease due to endocrine disrupting chemicals cost:

内分泌かく乱物質による疾患の治療にかかる医療費：

- \$340 billion in the US (2.3% of Gross Domestic Product)
- **米国で3400億ドル（国内総生産の2.3%）**
- €163 billion in Europe (1.2% of Gross Domestic Product)
- **欧州で1630億ユーロ（国内総生産の1.2%）**

And those estimates are based on:

これらの見積もりの根拠となっているのは...

- <5% of all EDCs
- **内分泌かく乱化学物質全体の5%未満**
- A subset of diseases due to those EDCs
- **それらの内分泌かく乱物質に起因する疾患の一部**
- A subset of costs due to those diseases
- **それらの疾患の治療にかかる医療費の一部**

The costs are likely much higher

医療費は、はるかに高いと思われる



We must learn this lesson

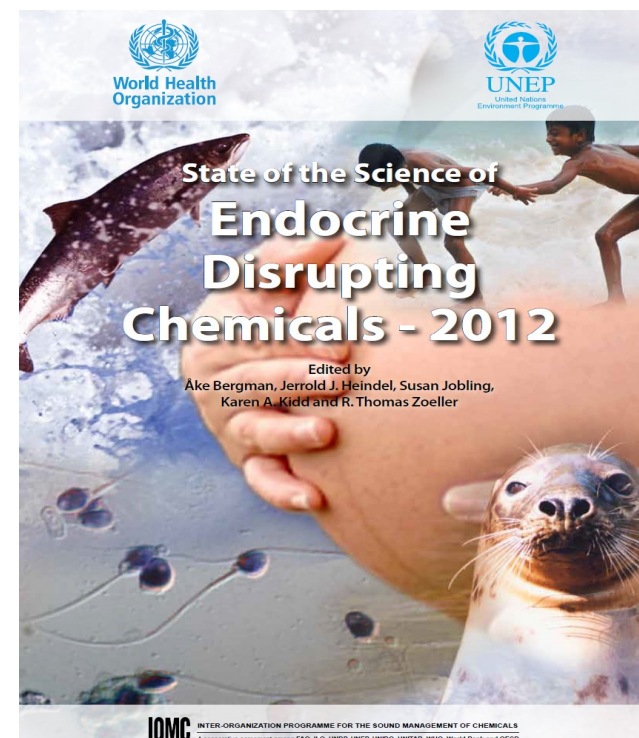
## 学ぶべき教訓

### Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement

Evanthia Diamanti-Kandarakis, Jean-Pierre Bourguignon, Linda C. Giudice, Russ Hauser, Gail S. Prins, Ana M. Soto, R. Thomas Zoeller, and Andrea C. Gore

Endocrine Section of First Department of Medicine (E.D.-K.), Laiko Hospital, Medical School University of Athens, 11527 Athens, Greece; Department of Pediatrics (J.-P.B.), Centre Hospitalier Universitaire de Liege, 4000 Liege, Belgium; Department of Obstetrics, Gynecology, and Reproductive Sciences (L.C.G.), University of California San Francisco, San Francisco, California 94131; Department of Environmental Health (R.H.), Harvard School of Public Health, Boston, Massachusetts 02115; Department of Urology (G.S.P.), University of Illinois at Chicago, Chicago, Illinois 60612; Department of Anatomy and Cell Biology (A.M.S.), Tufts University School of Medicine, Boston, Massachusetts 02111; Biology Department (R.T.Z.), University of Massachusetts, Amherst, Massachusetts 01003; and Division of Pharmacology and Toxicology (A.C.G.), The University of Texas at Austin, Austin, Texas 78712

There is growing interest in the possible health threat posed by endocrine-disrupting chemicals (EDCs), which are substances in our environment, food, and consumer products that interfere with hormone biosynthesis, metabolism, or action resulting in a deviation from normal homeostatic control or reproduction. In this first Scientific Statement of The Endocrine Society, we present the evidence that endocrine disruptors have effects on male and female reproduction, breast development and cancer, prostate cancer, neuroendocrinology, thyroid, metabolism and obesity, and cardiovascular endocrinology. Results from animal models, human clinical observations, and epidemiological studies converge to implicate EDCs as a significant concern to public health. The mechanisms of EDCs involve divergent pathways including (but not limited to) estrogenic, antiandrogenic, thyroid, peroxisome proliferator-activated receptor  $\gamma$ , retinoid, and actions through other nuclear receptors; steroidogenic enzymes; neurotransmitter receptors and systems; and many other pathways that are highly conserved in wildlife and humans, and which can be modeled in laboratory *in vitro* and *in vivo* models. Furthermore, EDCs represent a broad class of molecules such as organochlorinated pesticides and industrial chemicals, plastics and plasticizers, fuels, and many other chemicals that are present in the environment or are in widespread use. We make a number of recommendations to increase understanding of effects of EDCs, including enhancing increased basic and clinical research, invoking the precautionary principle, and advocating involvement of individual and scientific society stakeholders in communicating and implementing changes in public policy and awareness. (*Endocrine Reviews* 30: 293–342, 2009)



Doctors are speaking out

# 声を上げ始めた医師たち

TECHNICAL REPORT

American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

## Food Additives and Child Health

Leonardo Trasande, MD, MPP, FAAP,<sup>a</sup> Rachel M. Shaffer, MPH,<sup>b</sup> Sheela Sathyanarayana, MD, MPH,<sup>b,c</sup>  
COUNCIL ON ENVIRONMENTAL HEALTH

## 食品添加物と子ども健康

**POLICY STATEMENT** Organizational Principles to Guide and Define the Child Health Care System  
and/or Improve the Health of all Children

American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

## Food Additives and Child Health

Leonardo Trasande, MD, MPP, FAAP,<sup>a</sup> Rachel M. Shaffer, MPH,<sup>b</sup> Sheela Sathyanarayana, MD, MPH,<sup>b,c</sup>  
COUNCIL ON ENVIRONMENTAL HEALTH





We must all rise up

## 今こそ立ち上がるべき時

Even if we cool the planet, if we do not address this challenge, the next generation will be so contaminated by endocrine disrupting chemicals that our survival will be threatened.

たとえ地球温暖化が抑えられたとしても、この問題に対処しなければ、次の世代は内分泌かく乱物質による汚染にまみれ、人類の存続が脅かされることになる。



So what do we do?

## 私たちがやるべきことは？

Fortunately, there are safe and simple steps families can take at home to limit these exposures.

幸いにも、内分泌かく乱化学物質の曝露を抑えるために  
家庭でできる安全かつ簡単な対策がある。

We can also advocate for proactive policies that limit exposures to common dietary contaminants.

食品に含まれることの多い汚染物質への曝露を制限する前向きの政策を支  
持することも可能。

Safe and simple steps

## 安全かつ簡単な対策

Eat organic.

有機食品を摂取する。

Avoid canned foods.

缶詰類を避ける。

Don't microwave plastic containers or put them in the dishwasher.

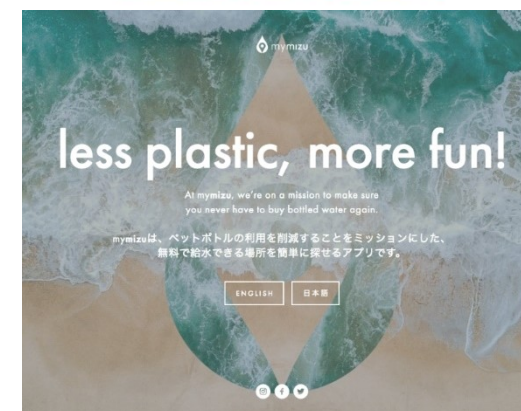
プラスチック製容器をレンジ加熱したり、  
食器洗い機で洗浄したりしない。

Use less plastic.

プラスチック製品の使用を減らす。

Outdoor air has lower concentrations of chemicals that accumulate from electronics, carpeting and the like, and recirculating the air a few minutes every day gets rid of other chemical residues too.

外気は電化製品やカーペットなどから出る化学物質の濃度が低く、毎日数分でも室内の空気を入れ替えればその他の残留化学物質も排出される。



Safe and simple steps

## 安全かつ簡単な対策

Replace old furniture that has exposed foam or cover it with a slipcover.

発泡材がむき出しになっている古い家具を新しいものに替えるか、発泡剤をカバーで覆う。

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Buy products made from natural fibers (like cotton and wool), which are naturally less flammable.

可燃性が低い天然繊維（コットンやウールなど）で作られた製品を購入する。

Vacuum regularly with a HEPA filter and mop with a wet mop to prevent dust from accumulating.

ホコリがたまるのを防ぐため、定期的にHEPAフィルターの付いた掃除機で掃除して湿らせたモップをかける。

Stop children from touching or mouthing on fire-retardant items.

子どもに難燃性の製品を触ったり口にしたりさせない。

Be careful when removing old carpet, which may contain PBDEs.

古いカーペットにはポリ臭化ジフェニルエーテル（PBDE）が含まれている場合があるので、取り扱いに注意する。

Make sure you get a healthy diet with enough iodine.

ヨウ素を多く含んだ健康的な食事をするようにする。





We can succeed

## 私たちは成し遂げられる

Potential cost of one BPA alternative, oleoresin = \$0.022 per can

BPA代替物の一つであるオレオレジンの予想コスト＝1缶当たり0.022ドル

- 100 billion aluminum cans are produced annually
- アルミ缶の年間製造数は1000億個
- $100 \text{ billion} \times \$0.022 = \$2.2 \text{ billion}$
- 1000億個 × 0.022ドル＝**22億ドル**

Potential benefit of replacing BPA with lining free of health effects = \$1.74 billion

ビスフェノールAを健康影響のない内張りに替えることでえられると予想される  
利益＝**17億4000万ドル**

- Does not include other effects (cognitive, asthma, breast cancer)
- これには他の影響（認知機能、ぜんそく、乳がん）が含まれていない

Sensitivity analyses suggest as high as \$13.8 billion

感度分析によると、この数字は138億ドルまで増大

Trasande Health Affairs 2014  
トラサンデの保健政策2014



We have succeeded

## 私たちは成し遂げた

BPA-free baby bottles

ビスフェノールAを使用しない哺乳瓶

PFAS in buffet style food packaging

ビュッフェ形式の食品の容器に使用されるPFAS



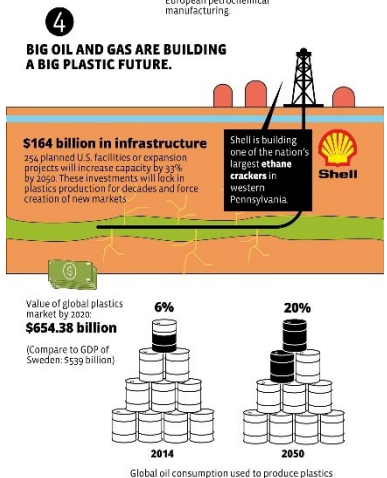
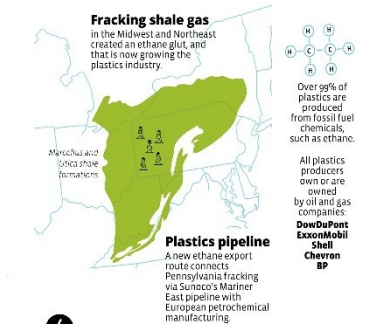
There is hope

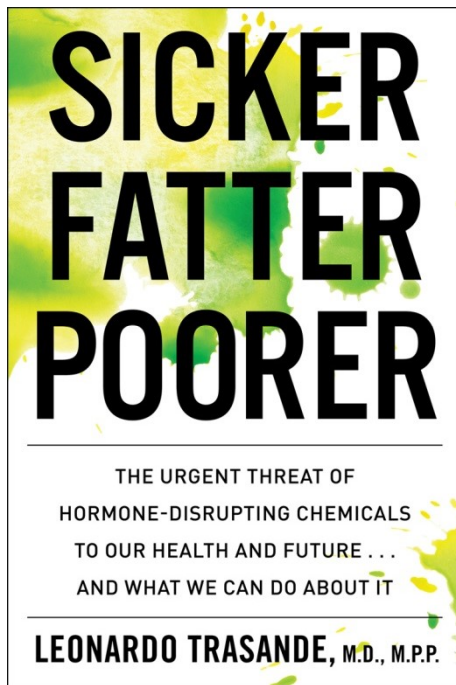
## 希望はある

- Millenials and post-millennials are “woke” to environmental threats
- ミレニアル世代とポストミレニアル世代が環境上の脅威に「目覚めた」
- Many of the same forces behind climate change are driving EDC exposures
- 気候変動を引き起こしている要因の多くが内分泌かく乱化学物質の曝露も増大させている



### THE FRACKING BOOM HAS CREATED A FLOOD OF SINGLE-USE PLASTICS.





Arigato!

ご清聴ありがとうございます！

For more information check out [leotrasande.com](http://leotrasande.com) or [sickerfatterpoorer.com](http://sickerfatterpoorer.com)

詳細については、[leotrasande.com](http://leotrasande.com)、または、[sickerfatterpoorer.com](http://sickerfatterpoorer.com)をご覧ください

