



RESEARCHING THE ENVIRONMENT AND WOMEN'S HEALTH

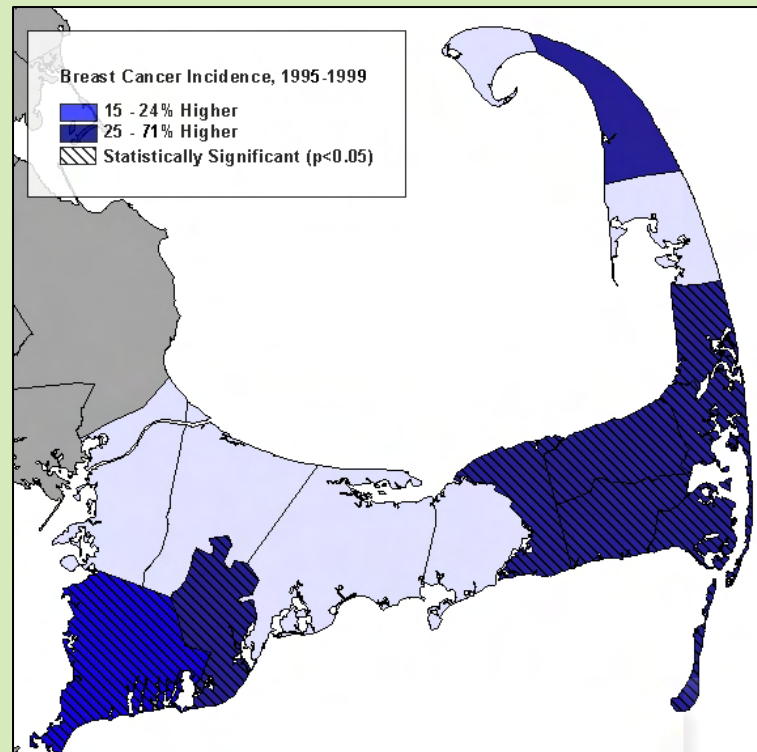
# Hidden Chemicals in Consumer Products: What's Not on the Label

Robin Dodson, ScD  
Silent Spring Institute



**SILENT SPRING INSTITUTE** is a non-profit scientific research organization dedicated to identifying the links between the **environment and women's health**, especially breast cancer.

We are a groundbreaking collaboration of scientists, physicians, health advocates, and community activists, and a leading edge research institution using multi-disciplinary, state-of-the-art approaches.



“A lab of our own”



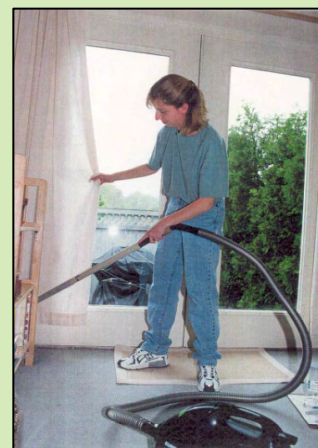
2009

Fourth National Report on Human Exposure to Environmental Chemicals



# Household Exposure Study

- 170 homes
- Air, dust, urine
- 89 endocrine disrupting compounds (EDCs)
- 30 measured for the first time indoors



# What are We Exposed To?



- About 20 chemicals per home
- 67 EDCs, 27 pesticides
- DDT 2/3 of homes
- Phthalates - 100% homes
- Parabens, alkylphenols - abundant
- Flame retardants - MA 10 x Europe levels; CA 200 X Europe
- 15 chemicals above guidelines (39 have guidelines)
- 100 of 120 homes above health guidelines



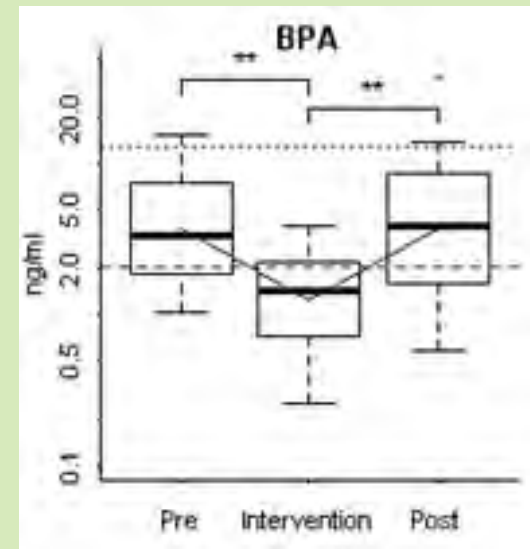
***How can I reduce my exposure while science and regulations are being worked out?***

***What exposure source is priority for control?***



# Evidence-based exposure reduction

- Intervention studies
  - Organic diets (Lu et al., 2005 EHP)
  - Reduced food packaging (Rudel et al., 2011 EHP)
  - 5-Day vegetarian diet – temple stay (Ji et al., 2010 Env Res)
- For household products – we first need to ID major sources and substitutes



# 50 product types





# 66 endocrine disruptors and asthma-associated chemicals

parabens	UV filters	phthalates	ethanolamines
triclosan	cyclosiloxanes	fragrances	
alkylphenols	BPA	glycol ethers	
Endocrine disrupting compounds			Asthma associated

Chemical Class	Use(s) in Products <sup>a</sup>	Potential Health Concerns <sup>b</sup>	Chemicals
parabens	preservative; anti-microbial agent	endocrine disruption (Kang et al. 2002)	methyl paraben ethyl paraben butyl paraben
phthalates	plastic additives; solvents in cosmetics and perfumes; inert ingredient in pesticides	endocrine disruption (Hannas et al. 2011; Hauser et al. 2006; Heindel et al. 1989; Howdeshell et al. 2008; Meeker et al. 2009; Mendiola et al. 2011; Swan et al. 2005). asthma associated (Bornehag et al. 2004; Bornehag and Nanberg 2010)	bis(2-ethylhexyl) adipate bis(2-ethylhexyl) phthalate benzylbutyl phthalate <i>di-amyl phthalate</i> di-cyclohexyl phthalate di-isobutyl phthalate di-isononyl phthalate di-n-butylphthalate di-n-hexyl phthalate di-n-octyl phthalate di-n-propyl phthalate diethyl phthalate
bisphenol A	production of polycarbonate plastic and epoxy resins	endocrine disruption (FAO/WHO 2010; NTP-CERHR 2008)	bisphenol A
antimicrobials	anti-microbial agent	endocrine disruption (Chen et al. 2008; Orton et al. 2011; Stoker et al. 2010)	<i>1,4-dichlorobenzene</i> <i>o-phenylphenol</i> triclosan triclocarban
ethanolamines	solvent in cleaners; emulsifier in creams and lotions	asthma associated (Kamijo et al. 2009; Makela et al. 2011; Piipari et al. 1998; Savonius et al. 1994)	monoethanolamine diethanolamine

Chemical Class	Use(s) in Products <sup>a</sup>	Potential Health Concerns <sup>b</sup>	Chemicals
alkylphenols	surfactant; disinfectant; inert ingredient in pesticides	endocrine disruption (Jie et al. 2010)	4-t-octylphenol octylphenol monoethoxylate octylphenol diethoxylate 4-t-nonylphenol nonylphenol monoethoxylate nonylphenol diethoxylate
fragrances	scent; masking agent	endocrine disruption (Bitsch et al. 2002; Schreurs et al. 2005; Seinen et al. 1999; van der Burg et al. 2008) asthma associated (Kumar et al. 1995)	<u>natural<sup>c</sup></u> benzyl acetate eugenol hexyl cinnemal limonene linalool methyl eugenol methyl salicylate pinene terpineol ----- <u>synthetic</u> AHTN bucinal diphenyl ether DPMI HHCB isobornyl acetate methyl ionone musk ketone musk xylene phenethyl alcohol

Chemical Class	Use(s) in Products <sup>a</sup>	Potential Health Concerns <sup>d</sup>	Chemicals
glycol ethers	solvent	asthma associated (Choi et al. 2010)	<i>2-isopropoxyethanol (R2)</i> <i>2-propoxyethanol (R2)</i> 2-butoxyethanol 2-phenoxyethanol (R2) <i>2-benzyloxyethanol (R2)</i> 2,2-methoxyethoxyethanol <i>2,2-ethoxyethoxyethanol (R2)</i> 2,2-butoxyethoxyethanol (R2)
perfluorinated	stain resistance	endocrine disruption (White et al. 2011)	<i>8:2 FTOH</i>
cyclosiloxanes	enhance conditioning and spreading	endocrine disruption (Quinn et al. 2007) carcinogenicity (Wang et al. 2009)	octamethylcyclotetrasiloxane (D4) (R2) decamethylcyclopentasiloxane (D5) (R2) dodecamethylcyclohexylsiloxane (D6) (R2)
UV filters	skin protection; product stability and durability	endocrine disruption (Schlumpf et al. 2004)	<i>3,4-methylbenzylidene camphor (R2)</i> benzophenone (R2) benzophenone-1 (R2) <i>benzophenone-2 (R2)</i> benzophenone-3 (R2) octinoxate (R2) <i>octadimethyl PABA (R2)</i>

<sup>a</sup> General use categories obtained from the NLM Hazardous Substance Data Bank and/or scientific literature

<sup>d</sup> Health effects have not necessarily been reported for all chemicals within the chemical class. Among the EDCs in this study, phthalates are the only chemical group for which there is supporting evidence of health effects from human studies. All asthma-associations are derived from human studies.

<sup>c</sup> Natural fragrances are readily available from plant materials, but can also be synthesized. Stereoisomer composition will differ for chemically synthesized materials. Our analysis did not determine whether these were synthesized or derived from plant materials.

R2 indicates chemicals added during the second round of sampling

Italicized chemicals were not detected in any sample

# Study design

170 Conventional products composited to represent 42 product types – increase generalizability

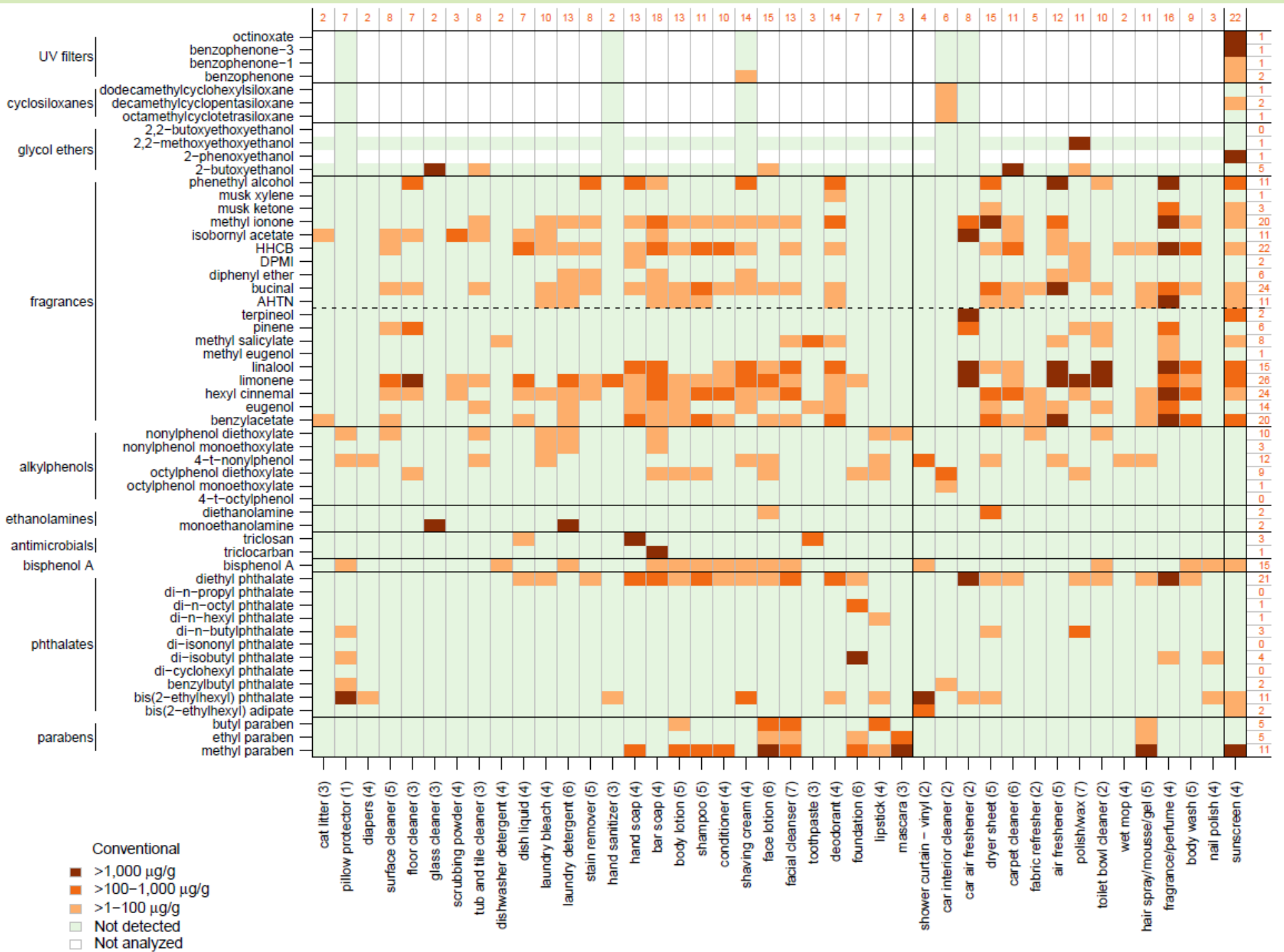
43 Alternative products analyzed individually – increase specificity

- *Limited ability to compare detection frequency and concentration between conventional and alternative*

## “Alternative” Product Criteria (labels did not indicate presence of) :

- ✓ parabens
- ✓ ethanolamines
- ✓ 1,4-dichlorobenzene
- ✓ nonionic surfactants
- ✓ fragrances (“natural” fragrances or essential oils permitted in some cases)
- ✓ tea tree oil, lavender
- ✓ triclosan, triclocarban, antimicrobial, antibacterial
- ✓ stain-resistant characteristics
- ✓ vinyl
- ✓ petroleum-based

*and met selection criteria for a nation-wide natural food store*







# Summary of findings

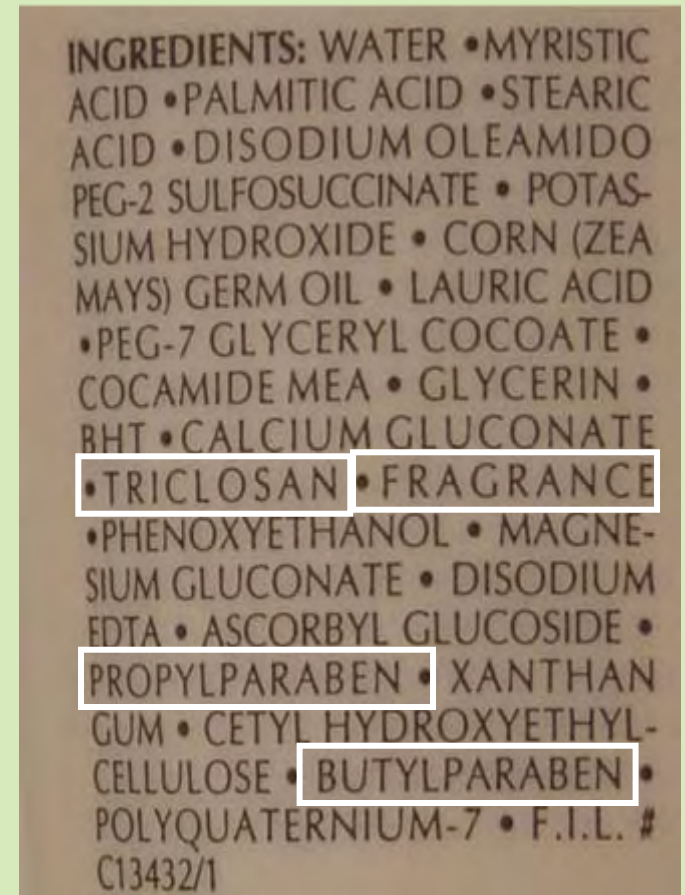
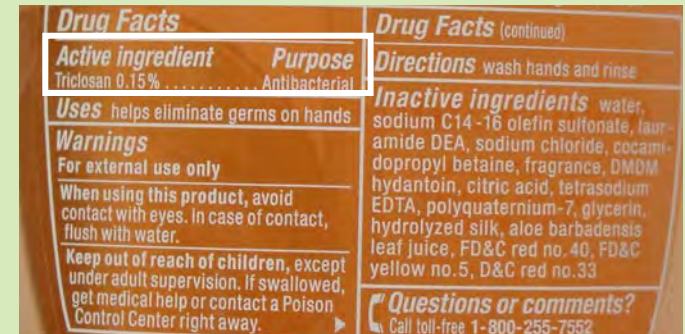
- Detected 55 chemicals
  - All conventional
  - 32/43 alternative
- Highest concentrations: DEHP, fragrance, DEA, glycol ethers, UV filters
- Largest # and highest concentrations: sunscreens and fragranced products
- Vinyl products – up to 28% DEHP by weight
- Substitutions?

# Mixtures

- Zero to 22 in single product type
- Correlation analysis
- Surface cleaner + tub and tile + laundry detergent + bar soap + shampoo and conditioner + facial cleanser and lotion + toothpaste = 19 target chemicals
- Implications:
  - Toxicity testing
  - Risk assessment
  - Epidemiology

# Label analysis

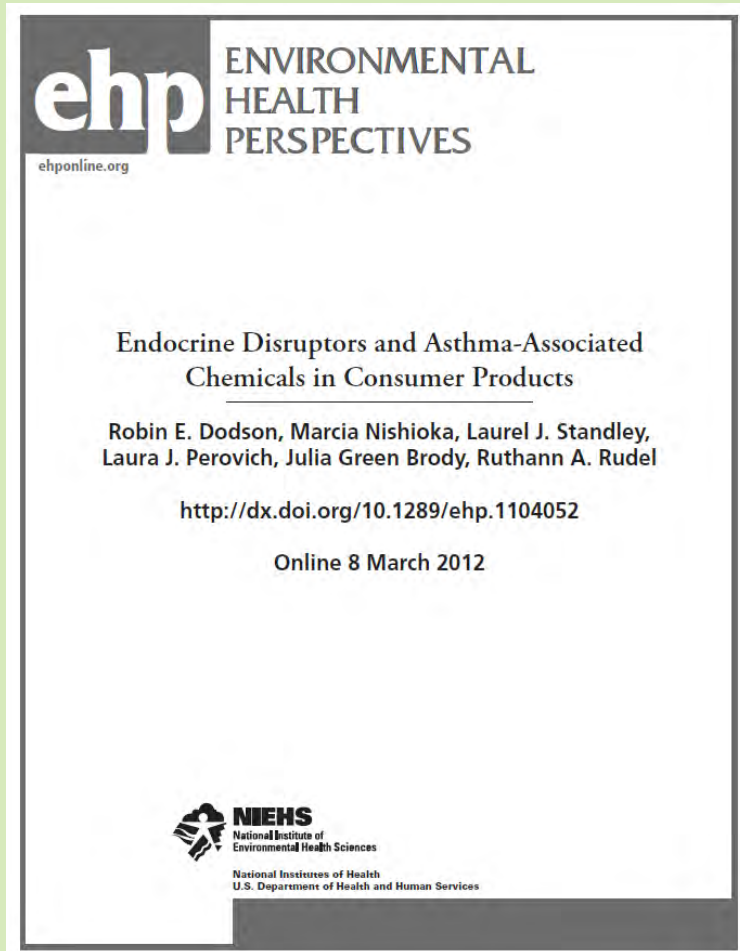
- It is possible to avoid some target chemicals through label reading but not all
- Generally not:
  - phthalates, ethanolamines, alkylphenols
- Generally yes:
  - parabens, antimicrobials, UV filters



# Conclusions and Implications

- Exposures add up for multiple products
- Tox studies and risk assessment needed for mixtures
- For epidemiology, findings raise concerns
  - confounding from co-occurring chemicals (e.g. DEP a marker for fragrance)
  - misclassification due to variation in product composition (self-report)
- Labels facilitate consumer choice for regulated active ingredients, synthetic fragrance, and BPA
- Intervention to reduce exposure – focus on vinyl, fragranced products, reducing number of different products used, alternatives to sunscreen (e.g., shade)

[www.silentspring.org/product-test](http://www.silentspring.org/product-test)



- Link to article
- Fact Sheet
- Tips Card
- Product Names
- Video

*The study was funded by the U.S. Centers for Disease Control and Prevention, the Goldman Fund, and Hurricane Voices Breast Cancer Foundation.*

'Safer' products often contain harmful chemicals, tests show

By Wendy Koch, USA TODAY

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Consumer products such as  
contain potentially harmful  
today that tested dozens of



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**Asthma Health Center**

**Questionable Chemicals Found in Household Products**

Many in Industry Question Study's Findings, Say Fears Unfounded

By Kathleen Doherty  
WebMD Health News



March 8, 2012  
hormone disruptors

On the list:

"Consumer products containing endocrine-associated chemicals," said the study, which links between the

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**Bisphenol A And Other Endocrine Disruptors Found In Common Household Products**

The Huffington Post | By Sarah Klein [Twitter](#) [Facebook](#)

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**Hormone-Disrupting Chemicals Found in Many Household Products: Study**

These ingredients also found in some 'alternative' brands, researchers say

March 8, 2012



By Jenifer Goodwin  
HealthDay Reporter

THURSDAY, March 8 (HealthDay News) -- Tests of more than 200 common household products that research suggests may be linked to asthma and hormone disruption, res

Expert • Independent • Nonprofit  
**ConsumerReports.org**

HEALTH  
**Study finds worrisome chemicals in wide range of consumer products**  
Mar 9, 2012 5:00 PM

A new study has found potentially harmful chemicals, such as asthma-related compounds and endocrine disruptors, in common consumer products including cosmetics, household cleaners, and personal care products, and many of the detected chemicals are not listed on product labels.

The study, which tested 213 commercial products representing 50 product types, was conducted by the Silent Spring Institute and published this week in the journal Environmental Health Perspectives.



# Top Tips

## CHOOSE

- ✓ Fewer products
- ✓ Plant-based ingredients
- ✓ Plain water, baking soda and vinegar for cleaning
- ✓ Shade, hats and tightly woven fabric cover-ups for sun protection



# Top Tips

## AVOID

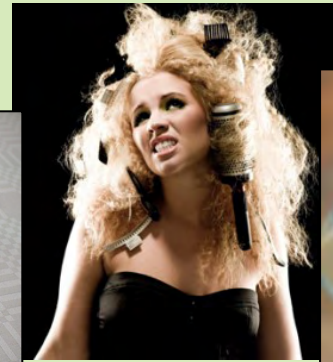


- ✓ **Fragrances** in cleaning and personal care products
- ✓ **Vinyl** products, especially pillows and mattress-protectors
- ✓ **Antimicrobials** in soap, toothpaste and other products (watch out for “antibacterial,” “antimicrobial,” “triclosan” and triclocarban” on the label)



# Top Tips

## AVOID



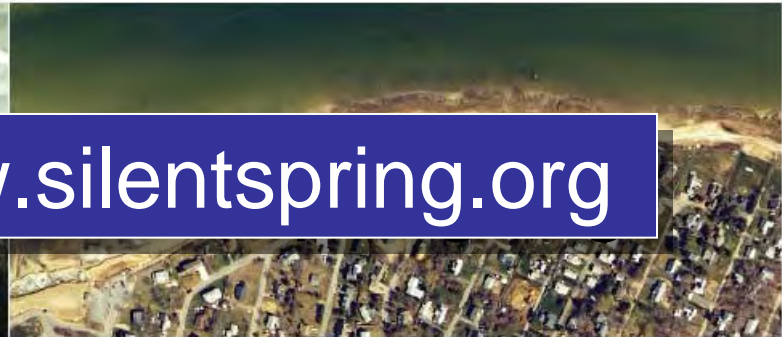
- ✓ **Stain resistant** furniture sprays or clothing
- ✓ **Lavender** and **tea tree oil**
- ✓ **Parabens** in lotions, deodorants, shampoos and other cosmetics (look for “paraben-free” and watch out for “methylparaben,” “ethylparaben” and “butylparaben”)
- ✓ **Cyclosiloxanes** in sunscreen and hair products (watch out for “cyclomethicone”)

A HEALTHIER FUTURE

View a brief introduction to Silent Spring Institute's research on the links between the environment and breast cancer, environmental health issues and the emerging field of green chemistry.



CLICK TO VIEW VIDEO



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Hidden chemicals in consumer products

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MassHEIS: Massachusetts Health and Environment System



Today's Environmental Health News

Silent Spring Institute researches the links between the environment and women's health, especially breast cancer.

FEATURED RESEARCH

Silent Spring scientists warn industry against overstating chemical safety claims

Consumer products contain potentially harmful chemicals not listed on labels

Our perspective on the IOM breast cancer and the environment report

Our impact in 2011

Study finds 27 contaminants in Cape Cod drinking water wells

Response to industry: Our food packaging study shows phthalate exposures exceed government health guideline

Review finds early exposure to common chemicals may affect breast health

MEDIA COVERAGE

Pollution, Poverty, People of Color: The factory on the hill, *Environmental Health News*

Silent Spring looks to end dry spell, *Cape Cod Times*

Don't Believe That Label, *The Atlantic*

8 Ways to Avoid Harmful Chemicals, *Maria's Farm Country Kitchen*

True Breast Cancer Prevention Requires Looking at Environmental Chemicals, *Cure*

Study Finds Dangerous Chemicals in Household Products, *On Point*

Hormone-Disrupting Chemicals Found in Many Household Products: Study, *U.S. News & World Report*

NEW AT SILENT SPRING INSTITUTE

Yoga-Zumba-Thon to benefit Silent Spring Institute, June 30

We will miss our friend and colleague Wanna Wright, J.D.

Thank you Avon Foundation, and all the Avon Walk Boston walkers, for supporting our environment and breast cancer research

Support Silent Spring by participating in the 2012 Cape Cod Charitable FunRaisers

DID YOU KNOW?

If a woman born in a low-risk area, such as Japan, moves to a high-risk area, such as California, her breast cancer risk rises, and the risk increases again for her daughters and yet again for her granddaughters. The reverse is also true—moving from a high-risk place lowers risk.