

Introduction

The Origins of BPA

Although bisphenol A (BPA) has been getting a lot of media attention in recent years, scientists have known for nearly 80 years that BPA acts like a synthetic estrogen. BPA was first synthesized in the 1890s. It was identified as a synthetic estrogen in the 1930s and considered for pharmaceutical use, but it was ultimately not pursued due to the identification of DES as a stronger synthetic estrogen.¹⁸

Decades after millions of women had been prescribed DES in a misguided attempt to prevent miscarriages, doctors discovered its link to a rare form of cancer and reproductive problems in women whose mothers took the drug. These studies went on to determine that more than 90 percent of DES daughters (those exposed to DES while in the womb) have abnormalities of the reproductive tract.¹⁹

Animal research sounded an early warning that human exposure to DES in the womb could lead to serious reproductive tract harm and hormone-sensitive cancers later in life.²⁰ This was later confirmed by real life tragedies as many women who were exposed to DES in the womb developed those diseases and fertility problems in adolescence and adulthood. More than two decades of research on the low dose effects of BPA show similar patterns of reproductive problems in animals and cells exposed to BPA.²¹

Unlike the relatively limited human exposure to DES, nearly all of us living in North America are exposed to BPA from a myriad of sources on a daily basis, like canned foods, which could pose serious health problems for ourselves and future generations.

Modern Uses of BPA

Chemists discovered that BPA was useful in making polymers (the foundation of plastic materials) and epoxy resins during the chemical revolution of the 1940s and '50s. In 1963, the Food and Drug Administration determined that BPA was “Generally Regarded as Safe,” allowing its use in food contact substances such as baby bottles and food cans. When the federal Toxic Substances Control Act (TSCA) was enacted in 1976, it “grandfathered in” BPA along with 62,000 other chemicals, allowing their use without requiring them to be tested or shown to be safe.

Studies of BPA have until recently been based on traditional toxicology, which assumes that if large amounts of a chemical can cause harm, then smaller amounts of the same chemical must cause less harm or no harm. In essence, this approach assumes that “the dose makes the poison” and



that looking at the effects of high doses of a chemical allows one to make educated guesses about the effects—or safety—of lower doses.²² Decades ago, scientists looked at high doses of BPA and determined that it could cause weight loss, and set the safety levels based on these higher-dose studies.

We know now that some chemicals that affect our hormones, like BPA, can actually have stronger effects in smaller amounts, especially during critical windows of development,²³ and that BPA can cause a wide range of adverse effects in laboratory studies at levels lower than those found in people’s bodies throughout the developed world.²⁴

BPA is now widely used in many different consumer products, from food can linings to DVDs and from baby bottles to thermal receipt paper and printer toner.

Because of the widespread use of, and eventual exposure to, bisphenol A, the U.S. Centers for Disease Control and Prevention have documented BPA’s presence in 93% of Americans²⁵ over the age of six. Adolescents had higher levels than adults, and younger children had the highest levels. In a separate study, premature babies were found to have ten times as much BPA in their bodies as CDC found in adults and five times as much as older children.²⁶ This is thought to be in part due in part to BPA leaching from some medical devices used in the NICU.²⁷

Some members of the population may be exposed to higher-than-average levels of BPA due to circumstances beyond their control, such as income and product availability. Low-income people may consume greater quantities of canned foods because they live in areas where fresh, affordable produce is unavailable, they are more reliant on canned foods from food banks or government agencies. In addition, low-income consumers may purchase canned goods (or polycarbonate containers) from discount stores where products are likely to stay on the market even after companies and other retailers have switched over to a safer alternative.

Workers in factories producing BPA, in steel canning or plating industries or in plastics facilities may also be exposed to higher levels of BPA. Unfortunately, little data exists on the exact nature and extent of these exposures.

Bisphenol A & Health Effects

BPA can disrupt how hormones carry messages in our body, and as such is part of a group of chemicals known as **endocrine disruptors**. Because it doesn't take very many hormone molecules to transmit messages in our bodies, endocrine disruptors can interrupt healthy signals at very low concentrations—in fact, even a few *parts per trillion* of BPA has

“Although estrogen is thought of as a female hormone, it’s found in both males and females, and the prostate gland is rich in estrogen receptors. There are also estrogen receptors in other parts of the body, including the cardiovascular system and the brain. That’s why estrogen-mimics like BPA can influence the reproductive tract and other parts of the body as well.”

Gail Prins, Professor of Physiology at the University of Illinois at Chicago.³²

been shown to disrupt normal communication that may lead to health problems.²⁸ (See chart on page 11.)

Endocrine disruptors often act differently at lower levels than at higher levels—in stark contrast to the outdated adage “the dose makes the poison.”

The U.S. EPA’s Lowest Observed Adverse Effect Level (LOAEL) of BPA in animal studies is 50 milligrams/ kilogram body weight/day (or 50 parts per million per day), which was set in the early 1980s based on observed weight loss in rodents.²⁹ EPA then set the “safe dose” a thousand times lower, or 50 micrograms/kilogram body weight per day

(50 µg/kg/day, or 50 parts per billion per day). For the purposes of this report, “low doses” of bisphenol A are considered those that fall below 50 µg/kg body weight/day.

Studies that are paid for by the chemical or plastics industry consistently find no harm from exposure to BPA.³⁰ By contrast, 202 of the 217 government-funded studies assessing health outcomes in laboratory animals related to low doses of BPA have found a variety of negative impacts on a range of organs.³¹

Health impacts linked to low-level exposure to BPA (in either animals or humans) include:³³

- Obesity³⁴
- Low sperm count³⁵
- Damage to developing eggs³⁶
- Miscarriage³⁷
- Placental cell death³⁸
- Infertility³⁹
- Heart disease⁴⁰
- Diabetes⁴¹
- Changes in brain development⁴²
- Predisposition to breast and prostate cancer.⁴³

The U.S. National Toxicology Program has publicly expressed *some concern* for effects on the brain, behavior, and prostate gland in fetuses, infants, and children at current human exposures to bisphenol A,⁴⁴ and recently, the U.S. FDA concurred.⁴⁵ The Canadian government has declared bisphenol A to be toxic and is taking steps to end the sale of polycarbonate baby bottles and sippy cups in Canada.⁴⁶

A consensus statement signed by 38 of the world’s leading researchers on BPA concluded that current levels of BPA in people were higher than those linked to health problems in laboratory studies.⁴⁷

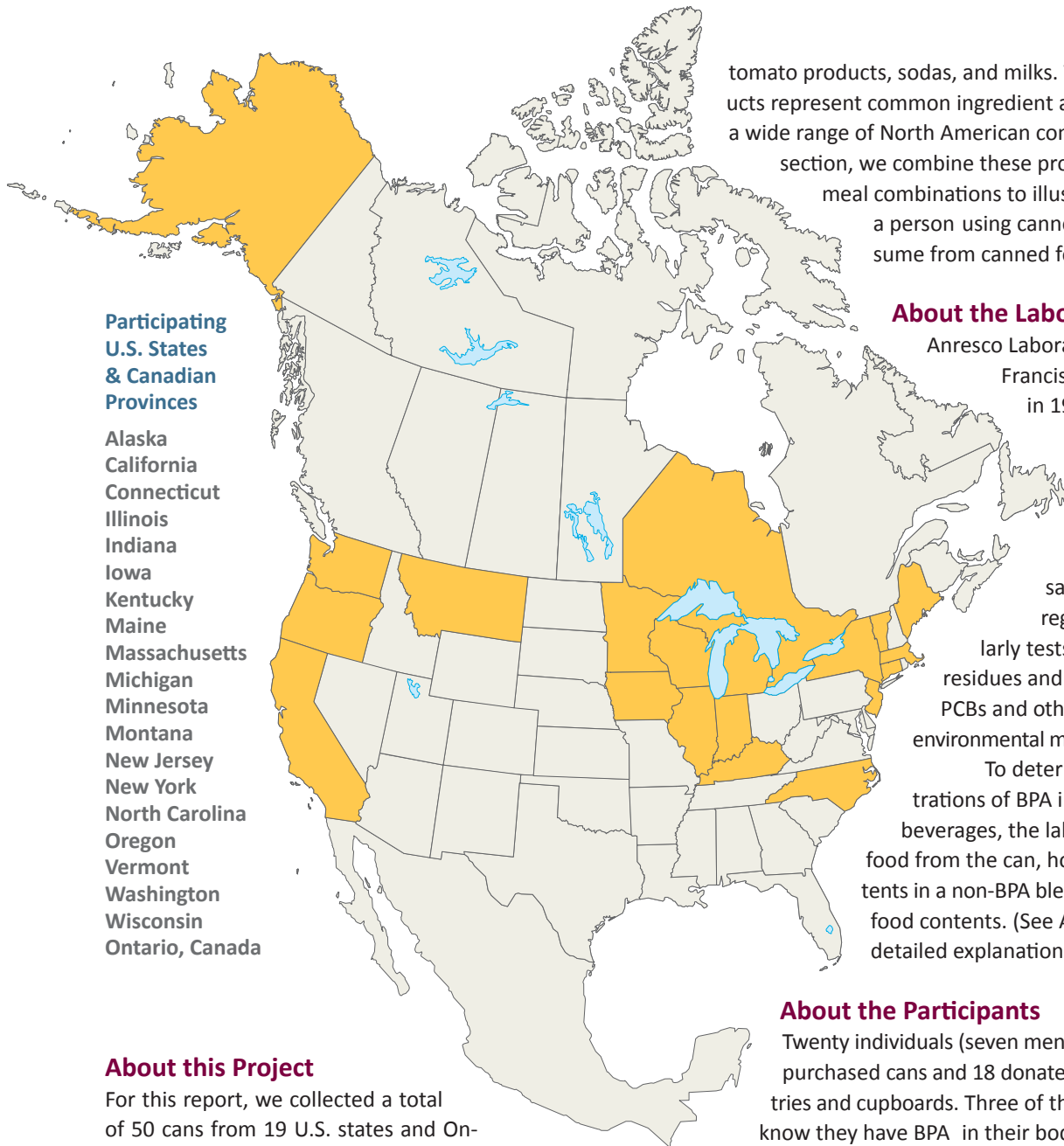
Where Products Came From

Products were purchased from these retailers:

- Albertson’s
- Hannaford
- Jewel-Osco
- Kroger
- Rainbow
- Safeway
- Shoprite
- Stop & Shop
- Walmart
- Whole Foods

Product Manufacturers:

- Campbell’s
- Coca Cola
- ConAgra (Chef Boyardee)
- DelMonte
- Goya
- Hain Celestial
- Muir Glen
- Walmart
- Whole Foods



Participating U.S. States & Canadian Provinces

Alaska
California
Connecticut
Illinois
Indiana
Iowa
Kentucky
Maine
Massachusetts
Michigan
Minnesota
Montana
New Jersey
New York
North Carolina
Oregon
Vermont
Washington
Wisconsin
Ontario, Canada

About this Project

For this report, we collected a total of 50 cans from 19 U.S. states and Ontario, Canada. States were selected based on the organizations' involvement in the Workgroup for Safe Markets, or because there is concern about the impacts of daily, repeated exposure to this chemical. In most cases, individuals submitted a can from their pantry or cupboard and purchased a matching or similar product from a national publicly traded grocery chain. We were interested in exploring potential correlations between BPA levels and the age of canned products.

A wide variety of products were tested for this investigation, including fish, fruits, vegetables, beans, soups,

tomato products, sodas, and milks. Together, these products represent common ingredient and meal options for a wide range of North American consumers. In the results section, we combine these products into possible meal combinations to illustrate how much BPA a person using canned foods may consume from canned foods alone.

About the Laboratory

Anresco Laboratories,⁴⁸ based in San Francisco, CA, was founded in 1943. It is an FDA accredited laboratory specializing in testing foods for nutritional analysis, food quality, food safety, and FDA import regulations. The lab regularly tests foods for pesticide residues and conducts tests for PCBs and other toxic chemicals in environmental media.

To determine the concentrations of BPA in canned foods and beverages, the laboratory removed the food from the can, homogenized the contents in a non-BPA blender, and tested the food contents. (See Appendix I for more a detailed explanation of the methodology.)

About the Participants

Twenty individuals (seven men and 13 women) purchased cans and 18 donated cans from their pantries and cupboards. Three of the participants already know they have BPA in their bodies because they previously had their blood and urine tested for BPA and other toxic chemicals.⁴⁹

Four of the study participants are new mothers, one of whom was pregnant at the time of the study. Another participant is a breast cancer survivor. Many are parents of young children. Based on studies of infant cord blood and breast milk, we would expect that BPA in the blood of our pregnant participant reached her developing fetus and that those nursing mothers who ate from BPA-contaminated food cans likely passed BPA on to their babies as they nursed.