



The **hidden** cost of receipts

How BPA and BPS find their way into our bodies

Every day, Canadians are exposed to a toxic chemical linked to prostate and breast cancer simply by touching receipts. Bisphenol A (or BPA) is consistently detected in the vast majority of Canadians due to its extensive use in plastics, food products and thermal paper receipts.

Even when steps are taken by governments and industry to eliminate it, nearly identical chemicals such as bisphenol S (BPS) have replaced it. Today, receipts are suspected to be a major source of our exposure to hormone disrupting chemicals.

BPA is everywhere and affects our health

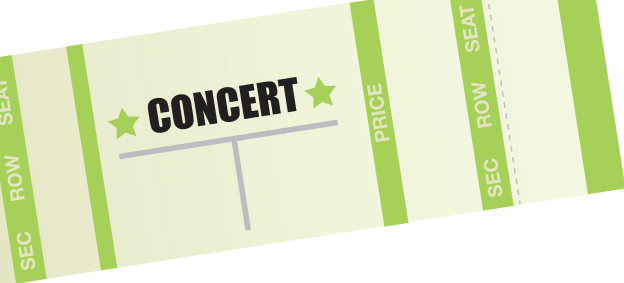
BPA is a high-volume industrial chemical used to make polycarbonate plastics (hard plastic), epoxy resins for food can liners and thermal paper. In 2016, approximately 8 million metric tonnes of BPA were used globally, and its consumption is projected to grow to 10.6 million metric tonnes by 2022.¹

BPA is widely known for its endocrine or hormone disrupting effects and is linked to a wide range of health issues including diabetes, obesity, ADHD in children and hormone-based cancers such as breast and prostate cancer.²

Canada was the first country in the world to ban the use of BPA in baby bottles in 2010. Since then, many companies have voluntarily removed BPA from products in response to rising consumer demand.

Yet, this chemical continues to be found in the bodies of Canadians, including children. In fact, nine out of 10 Canadians have BPA in their bodies according to Health Canada's latest Canadian Health Measures Survey.³ **Despite this, the Canadian government has failed to take further regulatory action to protect people from BPA and its replacements.**





The bisphenol alphabet

As the demand for *BPA-free* products increased, many consumer product manufacturers switched to alternatives such as BPS. As hormone disruptors, BPA and BPS both pose significant risks to pregnant women and children who are physiologically more susceptible to their estrogen mimicking effects.

The toxic receipt

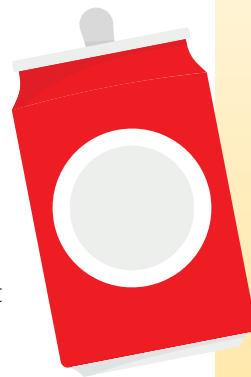
While dietary exposure to BPA from food and beverages stored in cans or reusable plastic containers continue to contribute to our daily exposure, recent scientific research points to another source as a major contributor to our daily exposure to both BPA and BPS: receipts.⁴

Cash register receipt paper as well as other paper slips such as transit or boarding passes and movie tickets that are thermally printed often contain BPA or BPS. Thermal printing is a process that uses heat to turn a chemical mixture (BPA or BPS) that coats the paper into print, without the use of ink, when heat is applied.

A recent study by the Ecology Center detected BPA or BPS in 93 per cent of receipts collected from various stores across the U.S. **This study also suggests that the use of BPS to replace BPA in thermal paper is on the rise.**⁵ This is troubling because BPS is suspected to more easily penetrate our skin compared to BPA and may be more potent in terms of toxicity.^{6,7}



Cashiers who handle upwards of hundreds of receipts throughout each work day face greater risk. In order to better understand and illustrate the risks facing cashiers in Canada, ENVIRONMENTAL DEFENCE conducted an experiment to measure the total exposure to these bisphenols after handling receipts for the equivalent of a full eight-hour shift.



The amount of BPA in receipts can be

1,000x greater

than the amount put into the lining of a food can.⁸



Our experiment

ENVIRONMENTAL DEFENCE staff, Muhannad Malas and Sarah Jamal, in partnership with the co-authors of the bestselling book *Slow Death by Rubber Duck*, Rick Smith and Bruce Lourie, volunteered to measure their body levels of BPA and BPS before and after the handling of receipts.

METHODOLOGY

STEP

1



Two-week BPA & BPS detox

For two weeks leading up to the day of the experiment, the four participants avoided all sources of BPA and BPS. This meant avoiding:

- canned food (including restaurant meals such as pizza with canned sauce),
- reusable plastic food containers,
- and touching receipts and other thermal paper (this meant wearing gloves at check-out).

STEP

2



Morning of experiment day: Sample #1

First thing in the morning, each participant collected a urine sample to measure BPA and BPS levels after the two-week detox and before handling receipts.

STEP

3



During the experiment

Each participant handled receipts for 17 minutes, the estimated total amount of time that a cashier handles receipts in an eight-hour shift.⁹ These receipts were collected from various stores across the Greater Toronto Area and Ottawa.

STEP

4

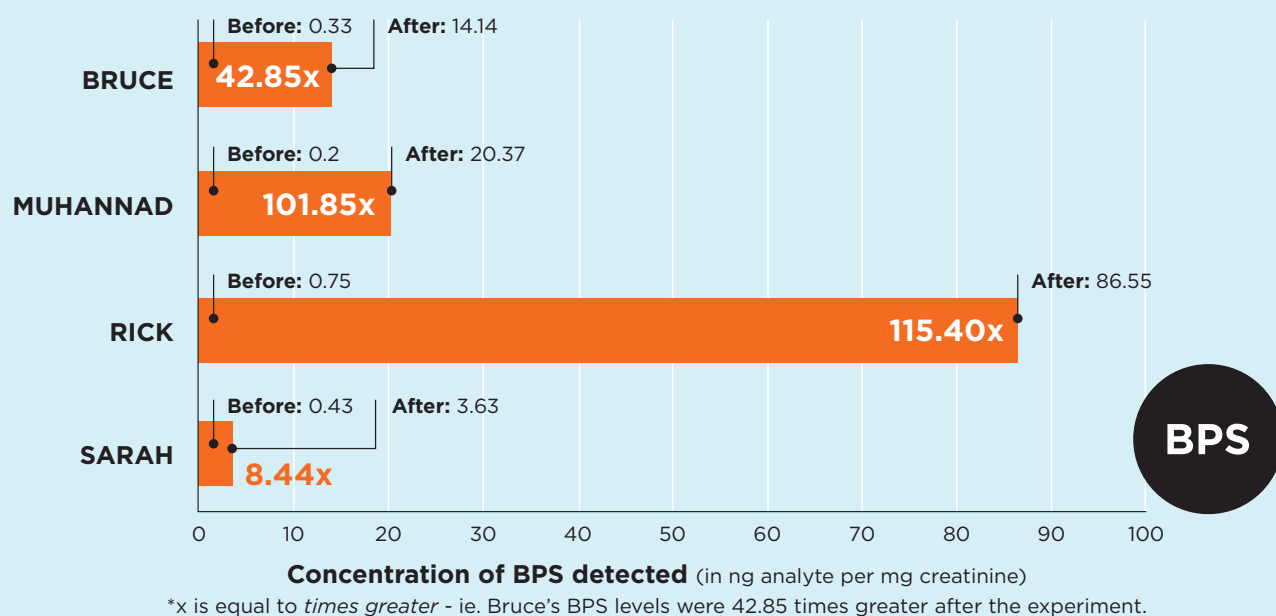


Evening of experiment day: Sample #2

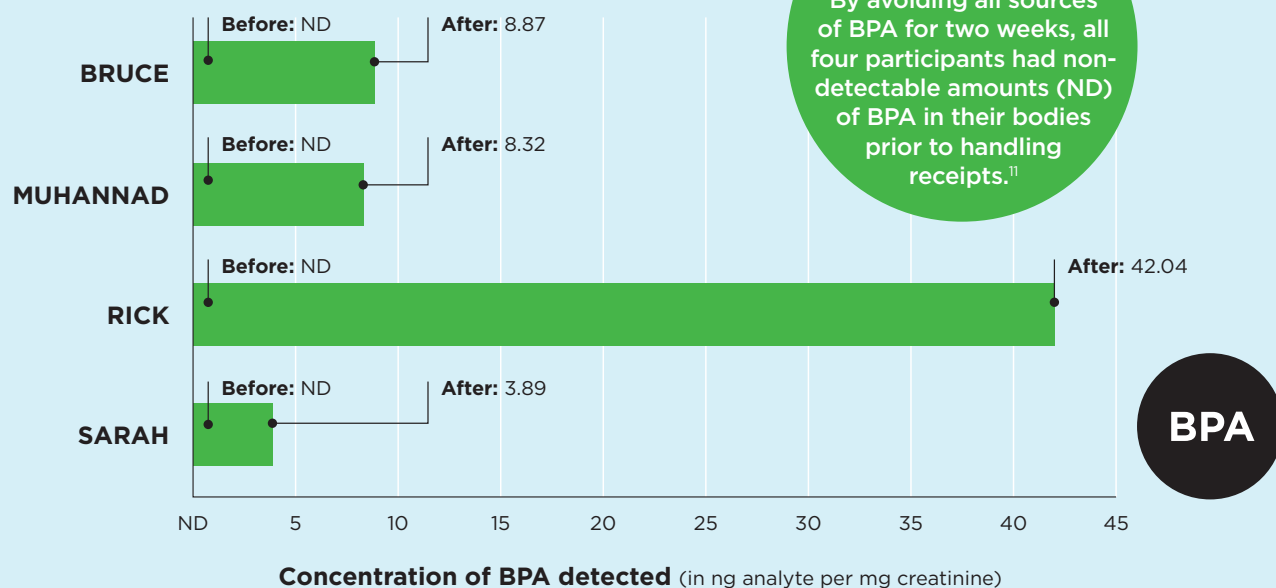
Eight to 10 hours after the experiment, each participant collected a second urine sample to measure BPA and BPS levels. The next day, all urine samples were sent to a lab for testing.¹⁰

Results

BPS LEVELS BEFORE & AFTER THE EXPERIMENT



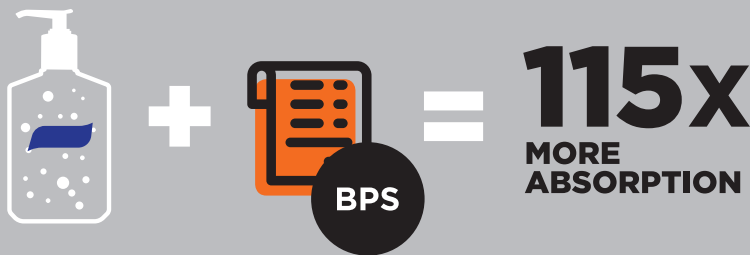
BPA LEVELS BEFORE & AFTER THE EXPERIMENT



Levels significantly increased

All four participants' levels of BPA and BPS increased from the morning (before the experiment) to the evening (after the experiment). On average, BPS levels were 67.14 times greater after handling receipts and all four participants had higher levels of BPS in their bodies than BPA. This is likely due to a greater use of BPS-coated receipts in the Canadian market.

Rick's exposure was the greatest



"The scale of chemical increase that I saw in my body is probably due to my use of hand sanitizer before the experiment. Given that many people, including cashiers, use hand sanitizer on a daily basis, this is a huge cause for concern."

RICK SMITH, co-author of *Slow Death by Rubber Duck*

Hand sanitizers worsen exposure

Rick, the only participant to apply hand sanitizer before handling the receipts, experienced a greater jump in BPA and BPS levels compared to Bruce, Muhannad and Sarah. This supports published research on the role of hand sanitizers in increasing skin absorption of bisphenols from receipts.¹² Many cashiers use hand sanitizers regularly in efforts to protect themselves from bacteria and other germs, further increasing their exposure.



"As a conscious consumer, I am shocked at the spike of parabens in my body from simply applying makeup. It shouldn't be up to the consumer to know what harmful ingredients are in the products they use; toxics shouldn't be allowed in products in the first place."

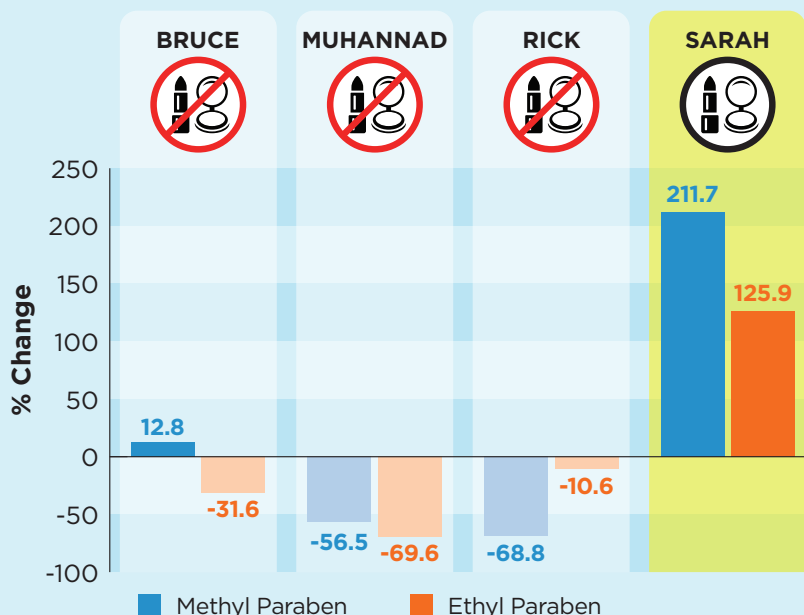
SARAH JAMAL, Communications Manager at Environmental Defence

Unexpected Discovery

Sarah's levels of parabens tripled by the evening!

Even though we didn't set out to measure paraben levels, the lab test included two parabens. Parabens are suspected hormone disruptors commonly added as preservatives to cosmetics and personal care products.

Whereas Bruce, Muhannad and Rick all observed a reduction or no substantial change in the levels of these parabens, Sarah's body levels more than doubled for ethyl paraben and tripled for methyl paraben. Sarah's makeup and skin care products that she applied in the morning are suspected to be the culprit!



Exposure adds up!

Growing scientific evidence underscores the urgent need to address cumulative exposure to chemicals that impact our bodies in similar ways or may lead to the same health impacts.¹³ Bisphenols are a perfect case in point. Receipts, food cans, soda and beer cans and reusable plastic containers all contribute to our total body burden of bisphenols.

How the government is failing to take action

After a decade since the Canadian government declared BPA toxic and subsequently banned its use in baby bottles, this hormone disruptor remains to be a significant threat to the health of Canadians, especially cashiers, and the environment.

Due to unacceptable risks to workers, particularly cashiers, the European Union will ban BPA in receipts starting in 2020.¹⁴

Health Canada doesn't consider BPA exposure in Canadians to pose a significant risk as average exposures are below the levels considered harmful. But a compelling body of scientific evidence shows that because BPA is a hormone disruptor, even low levels of exposure, especially in pregnant women and children, may cause health effects.¹⁵



"BPA is just one of many harmful chemicals that we are exposed to every day. The onus lies on governments to do the right thing, protect public health, and make sure that these kinds of chemicals aren't being used."

BRUCE LOURIE, co-author of *Slow Death*
by Rubber Duck



"These slips of paper are covertly exposing cashiers to worrying levels of hormone disrupting BPA and BPS every day. But it doesn't have to be this way: Canada should quickly move to ban bisphenols in receipts."

MUHANNAD MALAS, Toxics Program Manager
at Environmental Defence



Women face an increased risk



Cashier and retail sales jobs are **two of the most common occupations** among women in Canada.



250,000+ women in Canada worked as cashiers in 2016.



350,000+ women in Canada worked as retail salespeople in 2016.



A significant proportion of women working in these jobs are of **childbearing age**, many of whom are teenagers and young adults, and may face unacceptable health risks because of exposure to BPA and BPS on the job.¹⁶

Recommendations



For government

- 1** Ban the use of bisphenol-based thermal paper by 2021 and ensure that safer alternatives are used instead.
- 2** Require all retail stores to adopt electronic receipt (e-receipt) systems by 2023.



For consumers

- 1** Say “no” to receipts. Ask your favourite retailers to switch to e-receipts or bisphenol-free receipts.
- 2** Receipts should not be recycled as they contaminate the recycling stream. Throw your receipts in the trash.
- 3** Tell the Canadian government to ban BPA and BPS in receipts.
Take action at environmentaldefence.ca/receipts



For retailers

- 1** Alternatives exist! Switch to bisphenol-free thermal paper by 2020.
- 2** Adopt best practices that reduce the exposure from receipts including:
 - a.** Providing e-receipts,
 - b.** Asking customers if they need a receipt before printing,
 - c.** Providing cashiers with non-toxic protective gloves or food grade silicone fingertips until safer thermal paper is procured.



For cashiers

- 1** Fold the receipt with the printed side in as the back side is likely uncoated with bisphenols.
- 2** Ask your employer to switch to non-bisphenol receipt paper.
- 3** Avoid the use of hand sanitizers and wash your hands thoroughly whenever possible during your work shift, especially before eating.

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9. This was calculated based on conversations that Environmental Defence staff had with cashiers who were employed in the Greater Toronto Area (GTA) and estimates reported in the published literature.
10. All samples were sent to SGS AXYS Analytical Services Ltd. where they were analyzed for total BPA and BPS (free and conjugated) concentrations as well as for other chemicals of concern including parabens.
11. Preliminary levels of BPA in all four participants were below the limit of detection used by the lab.
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13. World Health Organization. Assessment of combined exposures to multiple chemicals. Available at: <https://www.who.int/ipcs/methods/harmonization/areas/aggregate/en/>
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A REPORT BY:



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