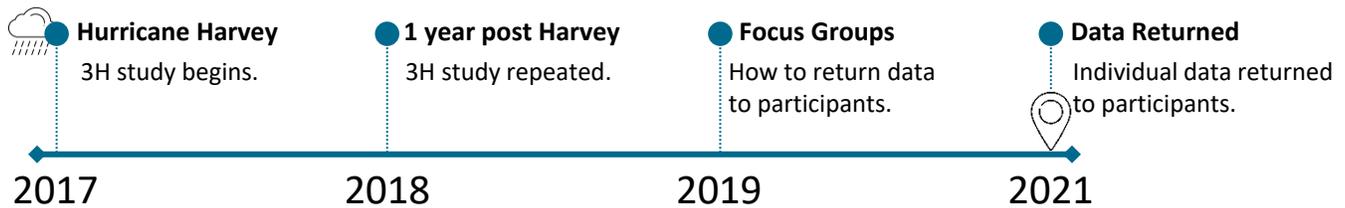# Houston Hurricane Harvey Health (Houston 3H) Wristband Report

OREGON STATE UNIVERSITY | BAYLOR COLLEGE OF MEDICINE

The rain from Hurricane Harvey caused catastrophic flooding in Houston, TX. Based on community concerns, researchers from Oregon State University collaborated with Baylor College of Medicine and the University of Texas Health Science Center at Houston (UTHealth).

TIMELINE

Hurricane Harvey
3H study begins.

1 year post Harvey
3H study repeated.

Focus Groups
How to return data to participants.

Data Returned
Individual data returned to participants.

2017   2018   2019   2021

WHAT WE FOUND

Chemical exposures were on average higher immediately after the flood. They were lower one year later.

Chemical exposures were different between neighborhoods.

WHAT IT MEANS

The flood may have led to increased chemical exposure to Houston-area residents.

With or without flooding, chemical exposures were higher in some study neighborhoods when compared with the other neighborhoods.

CHEMICALS WE LOOK FOR

Endocrine Disruptors mimic normal hormones. They can be found in water and food.

Caffeine is an example of **pharmaceutical** chemicals.

We look at household and commercial **pesticides**.

Personal care products include perfume, lotion and cosmetics.

Polycyclic Aromatic Hydrocarbons are a common type of air pollution produced by burning.

Dioxins & furans take a very long time to break down. They are natural and man-made.

Flame retardants can be used in furniture, making them harder to burn.

Polychlorinated Biphenyls (PCBs) are banned but can be found in fish and toxic waste.

Industrial chemicals can be found in plastic.

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CHEMICAL EXPOSURES WERE ON AVERAGE HIGHER IMMEDIATELY AFTER THE FLOOD (2017). THEY WERE LOWER ONE YEAR LATER (2018).

We looked for **1,530** chemicals found in several different chemical categories. These categories overlap. For example, hand sanitizer is a personal care product and a pesticide as it is designed to kill bacteria and viruses. For a full list of the chemicals, please visit: http://fses.oregonstate.edu/1530.

For many chemicals, we still do not know how much will cause a negative health effect. Our ability to measure very low levels of chemicals will help us understand what amount of chemical might be toxic.
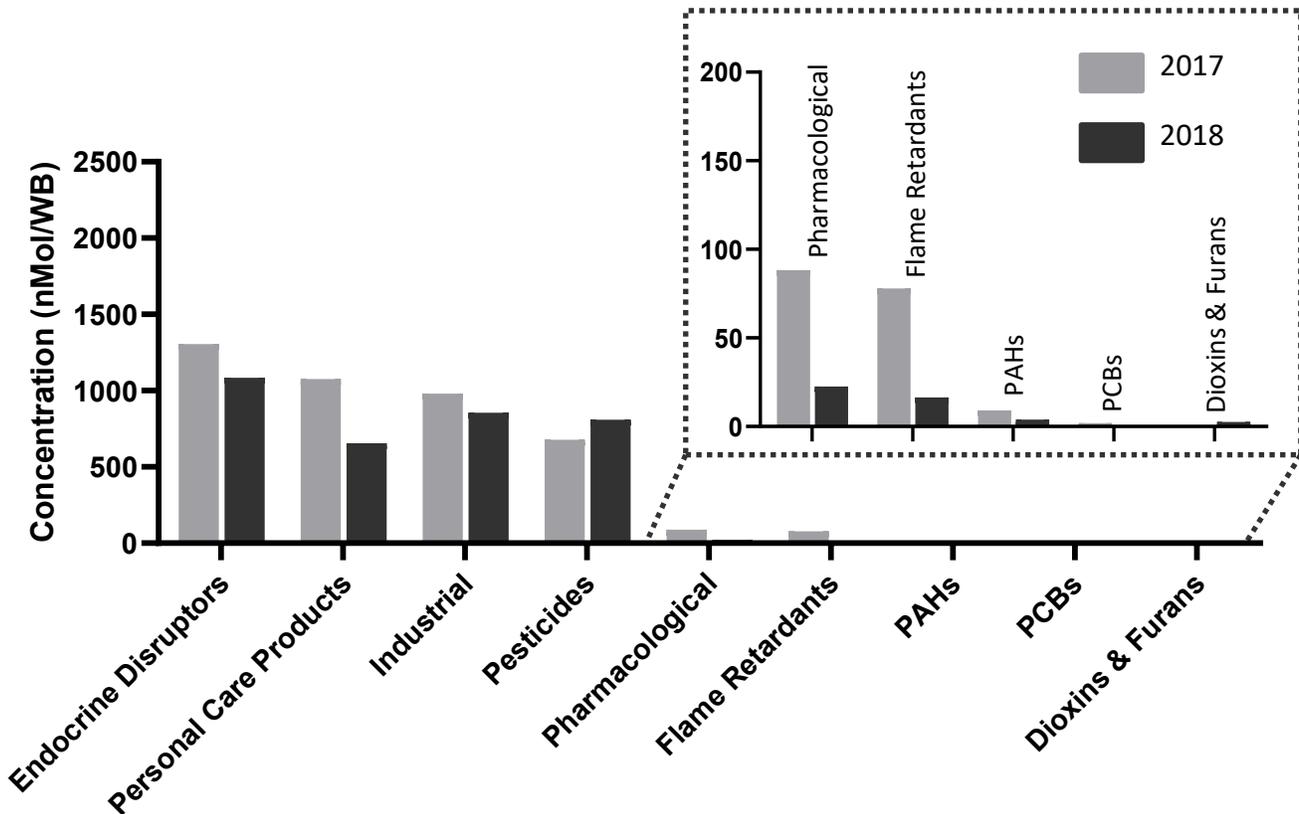
The flood may have led to increased chemical exposure to Houston-area residents.

We looked at the amount of chemicals found in each wristband, organized by chemical category. This allows us to look at the major chemical types of pollution a community is exposed to. We measure chemicals using a unit of measurement called a nanomole. This is a very, very small unit of measurement. To put that in perspective a drop of water contains almost 3 million nanomoles of water molecules.

In the graph above, you can see that people were mostly exposed to chemicals in the 'Endocrine Disruption' category, followed by chemicals in the 'Personal Care' category. More information is included for all chemical categories in this report.

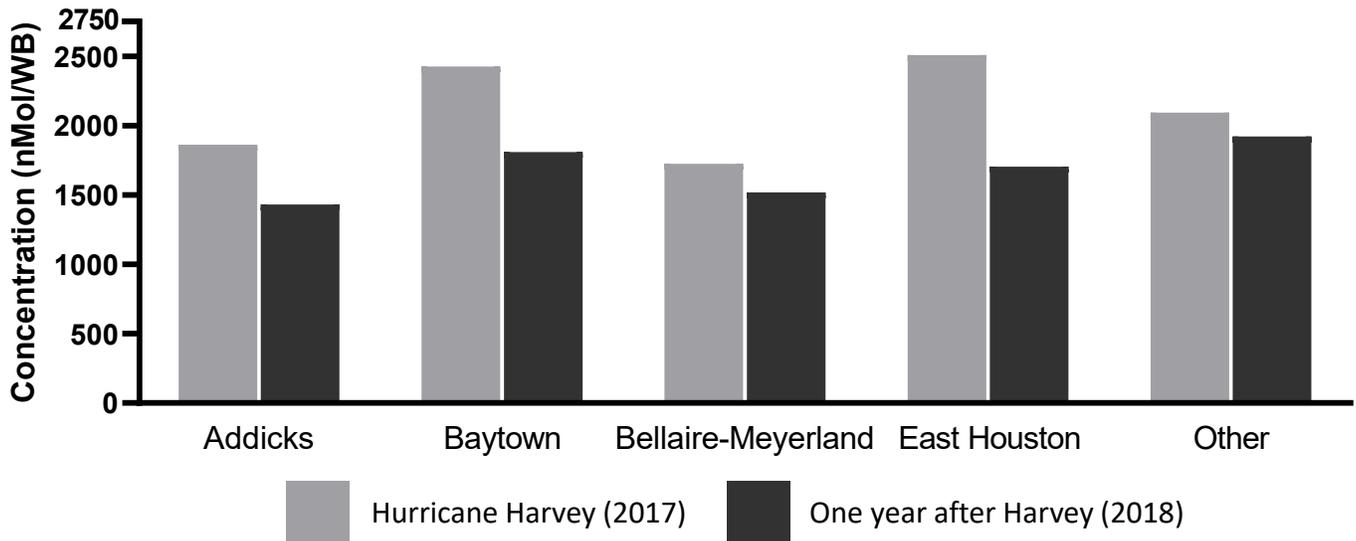# Houston Hurricane Harvey Health (Houston 3H) Wristband Report

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CHEMICAL EXPOSURES WERE DIFFERENT BETWEEN NEIGHBORHOODS.

With or without flooding, chemical exposures are higher in some Houston neighborhoods.

Chemical concentrations by neighborhood

Hurricane Harvey (2017)　　　One year after Harvey (2018)

All neighborhoods had higher levels of chemical exposure after Hurricane Harvey. Levels of chemical exposure in the Baytown neighborhood were generally higher, with the lowest levels seen in Bellaire-Meyerland. People outside of these defined neighborhoods are represented in the 'Other' category.
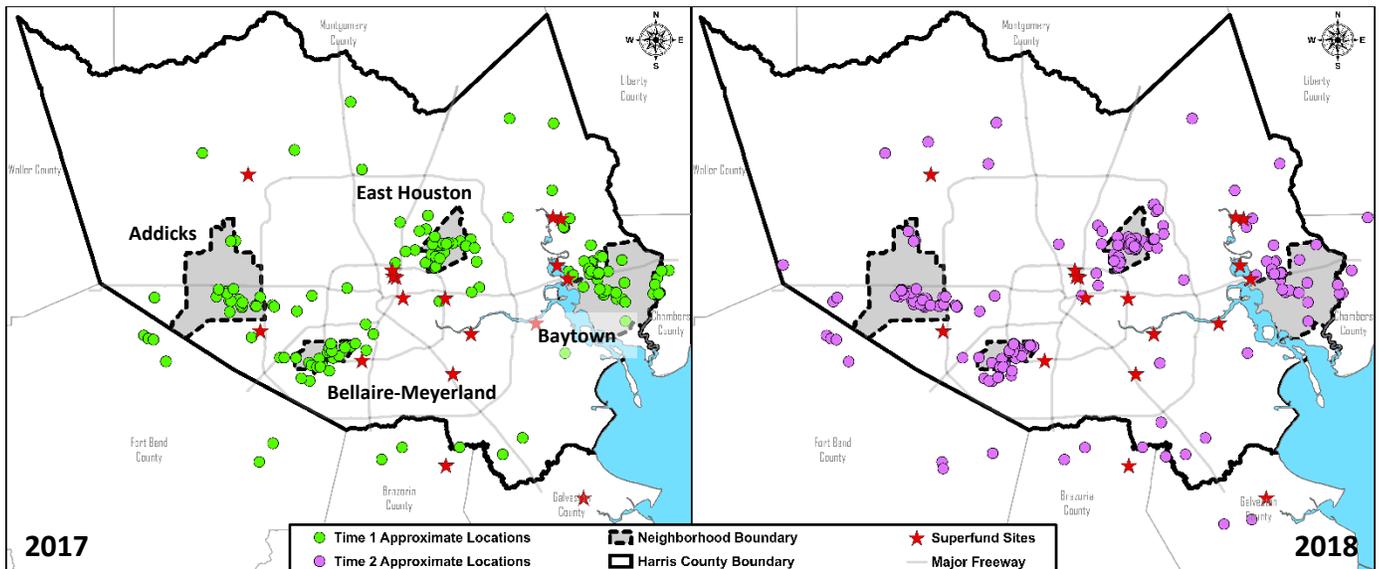
These maps show the different areas where we sampled (gray shaded area) and the approximate location of each participant (2017 = green dot, 2018 = purple dot. We also marked the area of known toxic waste sites (Superfund sites = red star).