



# Fragmented Information about PFAS Contamination in Private Wells and its Role in Housing Market Responses

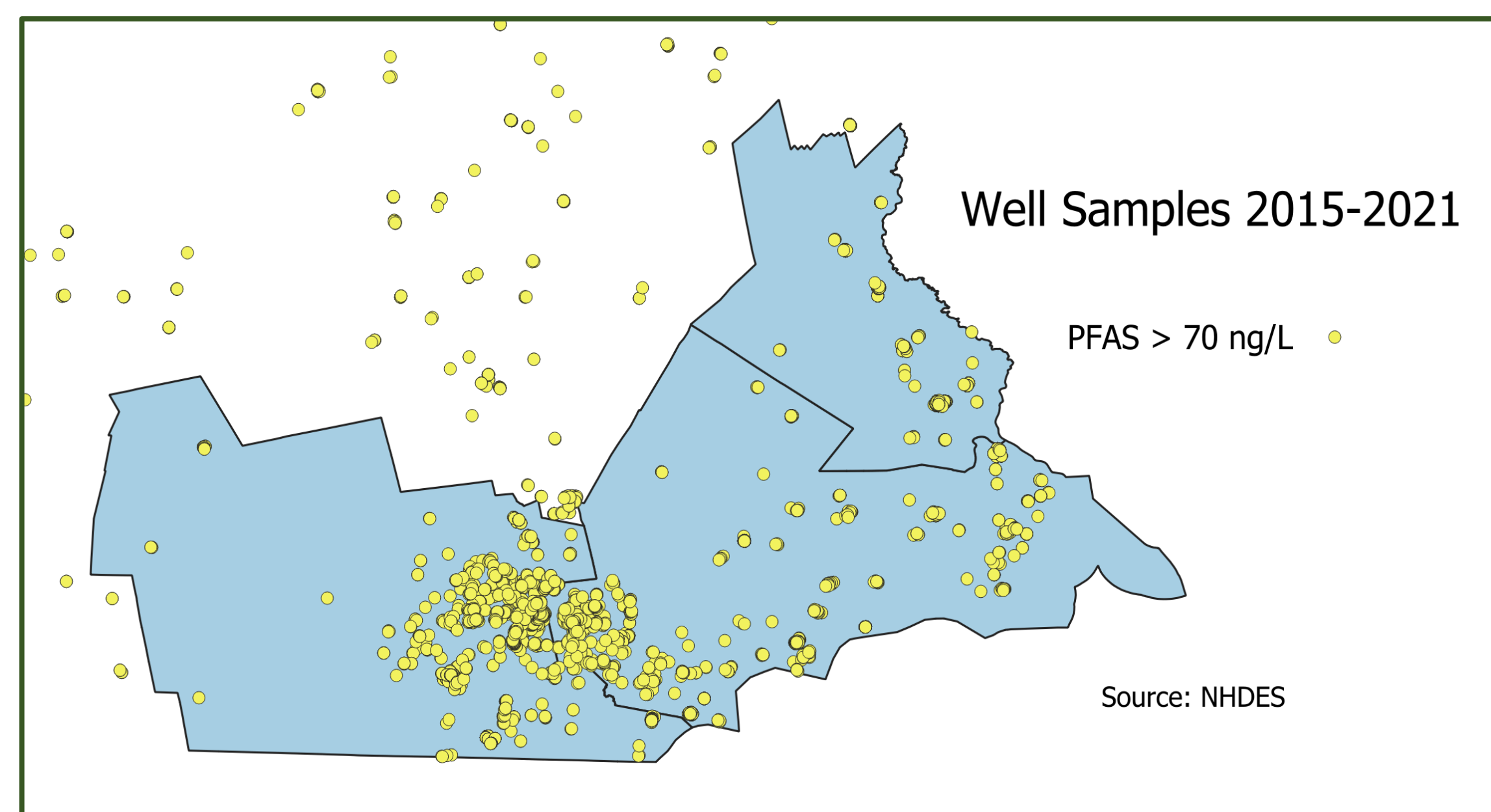
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## Abstract

PFAS are emerging contaminants that continue to rise in their public and political saliency. Although causal health outcomes are still unclear, there is evidence that the widespread and widely used family of chemicals has been correlated with negative human health impacts. The state of New Hampshire was one of the first in the country to regulate PFAS, establishing a lower maximum contaminant limit (MCL) than the EPA at the federal level. As PFAS policy continues to develop at the federal and state levels, it is important to consider how New Hampshire residents perceive this issue. In particular, residents in Hillsborough, Rockingham, and Strafford counties have been affected by unsafe levels of PFAS in their drinking water. Many of these residents, like 46% of the state, source their drinking water from private wells. In an attempt to quantify the value NH residents place on clean drinking water in their private wells, free from PFAS contamination, this study employs the hedonic property value method. Additionally, a survey was conducted to gain further insight into homeowner levels of information and perception about PFAS in drinking water. Further, a willingness to pay measure was calculated from this survey.

Study Area: Hillsborough, Rockingham, and Strafford Counties in New Hampshire



## PFAS in NH

PFAS exposure has been linked to developmental, autoimmune, and kidney disorders among children; reproductive disorders among women; cardiovascular, respiratory, reproductive, and liver disorders in those with occupational exposures (ATSDR, 2021). PFAs describe a group of man-made chemicals with a similar molecular structure. A variety of uses, such as industrial in the production of hardy plastics, waterproof clothing, and use in fire-fighting foam have led to the rapid production and spread of PFAs since their introduction. Southern New Hampshire has been significantly impacted by PFAS contamination in drinking water due to pollution from a plastics manufacturer in the town of Merrimack. In 2015 it was found that Saint-Gobain Performance Plastics had exposed nearby communities to PFAS through water and airborne releases that compromised nearby groundwater sources. After drinking water was tested, it was found that levels of PFAS above the state's maximum contaminant levels existed in the groundwater supplying drinking water in several surrounding towns (NHDES, 2022).

## Hedonic Property-Value Model Results

Following Lancaster (1966) and Rosen (1974), we construct the hedonic price model:

$$\ln(\text{Price}) = f(S, L, z, t)$$

And estimate it empirically:

$$\ln(\text{Price}) = \alpha_n(\text{SingleFamily, Age, Garage, Waterview, SquareFootage, County}) + t_n(2016-2021) + \beta(\text{PFAS} > 70 \text{ng/L}) + I_n(\text{Year} \times \text{PFAS} > 70 \text{ng/L}) + \epsilon$$

Variables:

S = Structural characteristics of home (SingleFamily, Age, Garage, Waterview, SquareFootage)

L = Locational characteristics (Hillsborough, Rockingham, Strafford Counties)

z = PFAS > 70ng/L in associated well

t = dummy variables denoting year home was sold

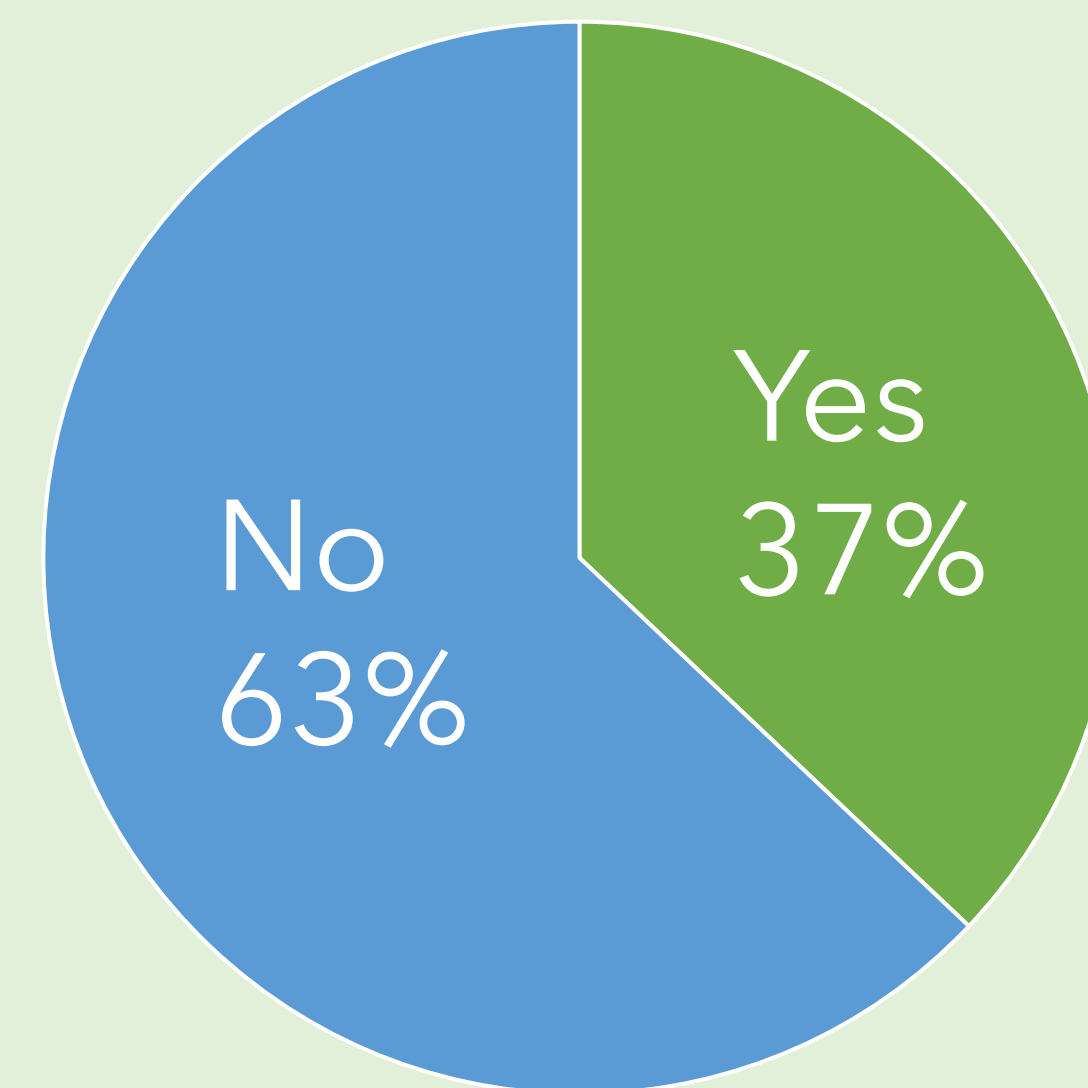
PFAS > 70ppt	0.04 (0.35)
2016 x PFAS	-0.17 (0.37)
2017 x PFAS	-0.07 (0.36)
2018 x PFAS	-0.20 (0.35)
2019 x PFAS	-0.04 (0.35)
2020 x PFAS	-0.08 (0.35)
2021 x PFAS	-0.05 (0.35)

**NO** significant effect of PFAS well contamination on a home's sold price.

Similar to other groundwater studies (Malone and Barrows, 1990; Page and Rabinowitz, 1993; Dotzour, 1997) this study **did not** find evidence that PFAS contamination in private wells over the state maximum contaminant limit has a significant effect on sold housing prices. However, it is unlikely that this result indicates that homeowners truly do not value avoidance of PFAS exposure.

## Fragmented Information

Were you aware of the potential for PFAS to contaminate a home's drinking water BEFORE you purchased your home?

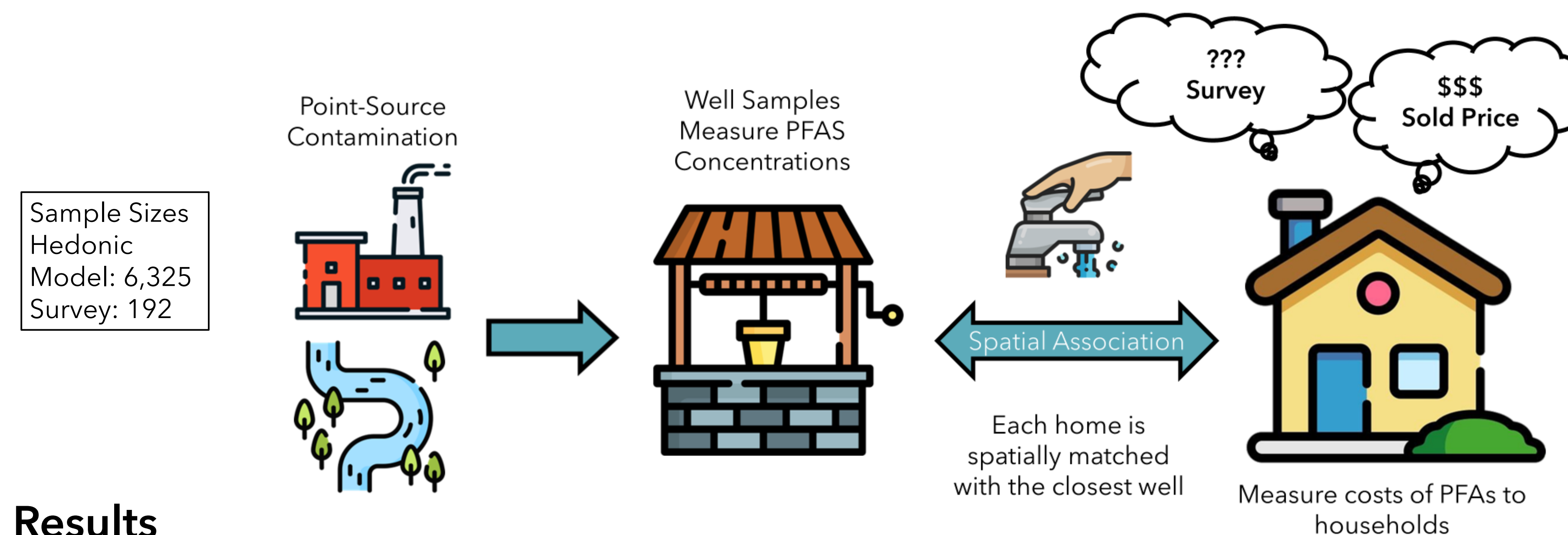


28.2% of those unaware before purchasing their home were *still* unaware of PFAS contamination even after moving into their home

It is often hypothesized that **asymmetrical information** could prevent the market response observed in the hedonic property method. If homeowners were unaware of the presence of PFAS in their well water or unsure of the risks associated with PFAS exposure, the bid they place when purchasing a home will be **unaffected** by these factors. The homeowner survey uncovered evidence that information about PFAS is fragmented, an important piece of context that lends itself to this information hypothesis. Currently, there is no requirement for home sellers to disclose the presence of PFAS in a property's drinking water, although a law is currently proposed at the state level (NH HB398, 2024). In our sample, **62.9%** of respondents were unaware of the potential for PFAS to contaminate a household's drinking water prior to purchasing their home.

**74%** researched the water quality home before purchase YET  
Only **35%** sought out information about PFAS (often or very often)

## Research Methods: Hedonic Regression and Survey



### Results

- Home Price Effects
- PFAS Contamination Awareness
- Level of Water Quality Concern
- Level of PFAS Concern
- Mitigation Actions
- Willingness to Pay for PFAS Removal

## Valuing PFAS Avoidance

The homeowner survey provides evidence that PFAS contamination in drinking water is a concern for NH residents and that they value the avoidance of such contamination.

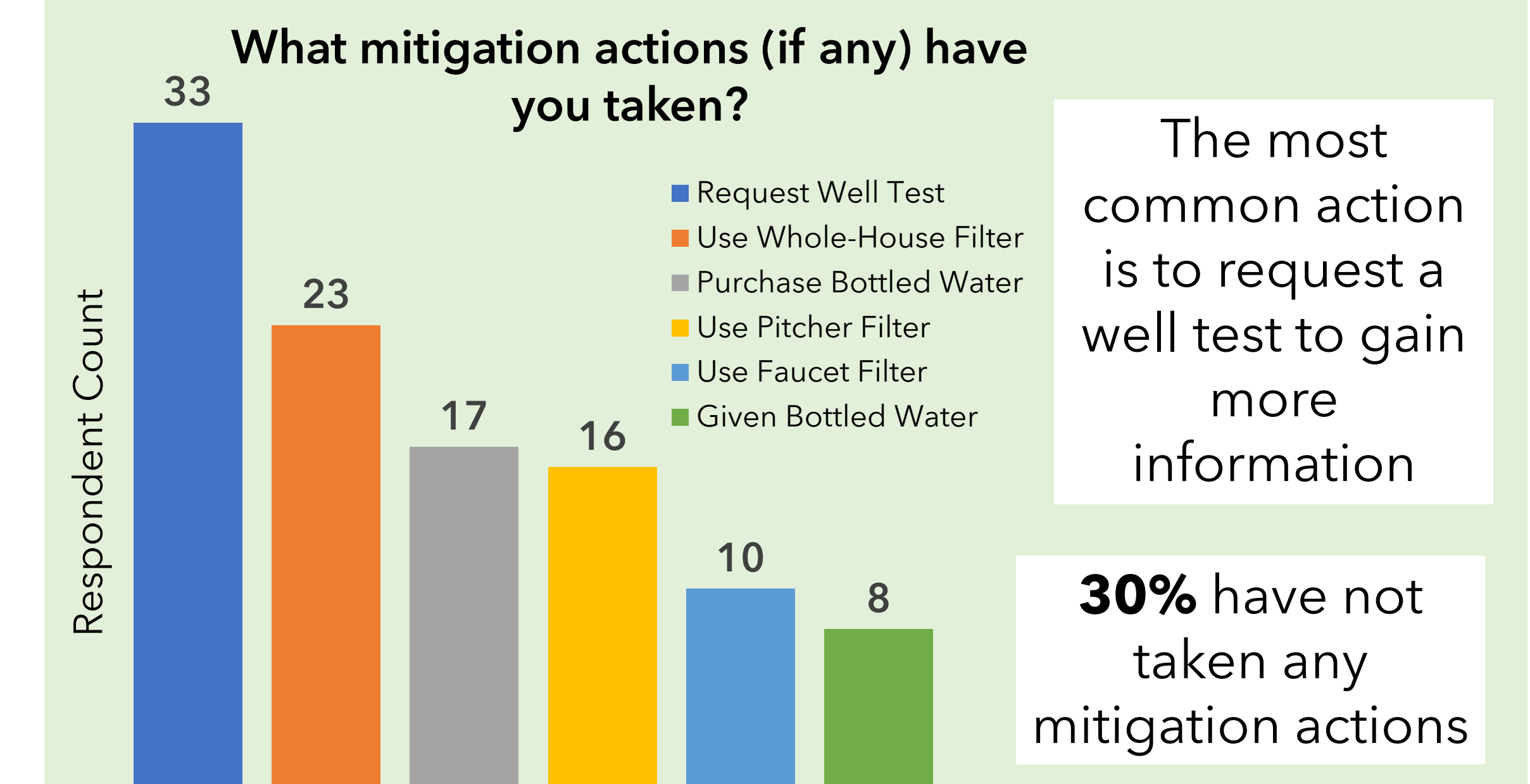
**75%** considered their drinking water to be safe YET  
**72%** expressed some to high concern about PFAS

A measure of willingness to pay was also constructed following a previous study of municipal water users in the state (Lemos, Price, and Halstead, 2022). Homeowners were asked how much they would be willing to pay for a monthly service that would fully protect their household from the negative health consequences of PFAS contamination.

**Monthly Average WTP = \$13.50**  
**Yearly = \$162**

## Mitigation Actions

The depreciation in home value expected from PFAS contamination might not occur if appropriate mitigation measures are taken, like a whole-house filter, to lessen or eliminate the health risks from exposure. Currently, there are several programs active in the state of New Hampshire to provide whole-house filters or rebates to homes severely affected by PFAS contamination.



## Recommendations

This study has implications for policy action in the state of New Hampshire to address a fragmented information landscape that has the potential to create issues of environmental justice and equity. This research suggests that homeowners are unaware of the full extent of PFAS contamination in private wells and cannot factor this aspect into their home-buying decision. However, NH residents are concerned about PFAS and value remediation. Policymakers should consider proposals like HB398 to require real estate disclosure and fund remediation efforts. State agencies should make greater efforts to adequately and consistently inform affected households about the presence and risks of PFAS in drinking water.

## References

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