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The **trust in tap water and bottled water consumption indicator** measures consumer perception of tap water safety and reliability. This measure is designed to capture consumers' trust in the whole system, from the quality of source water (i.e., aquifer pollutant levels) to the competence of water providers (i.e., the agency that supplies water) to the perception of finished water quality and aesthetics.

This indicator makes it possible to test the effect of policy initiatives on the public's perception of their water. Declining or low public trust may identify emerging, increasing, or long-standing water issues.

### WHY IS THIS INDICATOR IMPORTANT?

Consumer trust in tap water is important to public health, water affordability, the environment, and issues of social equity.

Mistrust of tap water correlates with increased consumption of sugary drinks and bottled water (Hu, et al., 2011; Onufrak, 2014). This substitution impacts physical health, household economics, and the environment.

The consumption of sugary drinks increases the risk of obesity and cardiovascular disease (Brown et al., 2008). Bottled water often lacks essential minerals contained in tap water, such as fluoride.

Consumers who rely on bottled water pay thousands of dollars more for drinking water than those who do not. As income does not correlate with tap water consumption, it is likely that poorer households choosing to buy bottled water pay inordinately for this essential good (Dupont et al., 2014; Hobson et al., 2007).

The environmental impacts of increased consumption of bottled water and sugary drinks include more pollution from the production and bottling processes, as well as more waste directed to landfills (Linden, 2013).

Trust in tap water correlates with race and nation of birth. Black, Hispanic, and foreign-born households are least likely to trust their tap water (Hobson et al., 2007). Trends in public trust may help identify populations that face other social equity issues because the impacts identified above are often concentrated in minority communities.

Studies measuring public trust in tap water have, among others:

- Gauged public support for environmental regulations or programs, thus informing policy development (Guo et al., 2019);
- Served as a proxy for trust in governmental authorities and the decisions they make (Ames et al., 2019);
- Informed which government authorities should communicate to constituents and how in public messaging (Beehler et al., 2003).

*This research is part of the Great Lakes Indicators project funded by the Erb Family Foundation. The project is rooted in the understanding that the environmental health of the Great Lakes directly affects the region's economic health, individual and societal health and well-being, as well as values and perceptions of the Great Lakes.*

*The Great Lakes offer valuable ecosystem services, including providing **drinking water** to many of the region's inhabitants. The **drinking water indicators** are intended to help regional leaders and advocates understand their water quality, reliability, affordability, and constituents' trust in their drinking water, better positioning them to influence management and policy decisions.*

## HOW IS IT MEASURED?

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There are two primary methods to measure public trust in tap water:

1. Questionnaires that ask consumers directly about their trust in their tap water;
2. Quantitative data on the amount of bottled water purchased per capita, or as a function of household grocery expenses.

Questionnaires can be similar to the U.S. Census Bureau American Housing Survey question, which ran from 1997 through 2015:

*In your opinion, is the water from this source safe for cooking and drinking?*

The quantity of bottled water consumed requires retail grocery market data—or, alternatively, can be added as a survey question.

## DATA AVAILABILITY AND LIMITATIONS

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Since 2018, the International Joint Commission's (IJC) Binational Great Lakes Basin Poll has included questions about the perceived safety and affordability of drinking water. The triennial reports provide responses by state and province. Also available is a more detailed dataset that provides data by age, income, and gender. The IJC supplies estimates of the margin of error for the total survey sample, as well as for each of the areas surveyed.

In 2018, the IJC conducted sample person-to-person phone interviews using random digit dialing in order to reach landlines and cellphones, and thus reflect populations of nine jurisdictions (eight states and one province). The international sample of 4,250 persons represents 40 million residents of the Great Lakes region. Non-responses/busy numbers were called five times, after which they were discarded if they remained unresponsive.

U.S. responses from the IJC poll can be cross-checked with results from the American Housing Survey (AHS) public use file, which is conducted by the U.S. Census

Bureau every two years. The AHS collected binary responses on the perceived safety of water for drinking and cooking from 1997 through 2015. Microdata is available online. Each record is associated with a specific household that can be linked geographically to the IJC data.

According to AHS data, nationally in the U.S. between 2011 and 2015, the percentage of households that deemed their tap water unsafe to drink declined from 8.13% to 7.31%. Demographically, the percentage of Hispanic households that deemed their water unsafe to drink declined from 19.95% to 16.39%, while mistrust of tap water among Black households increased from 7.11% to 8.48%.

Geographically, the AHS data allow for analysis at the census-division level. Mistrust of tap water in the East North Central division, which covers Illinois, Indiana, Michigan, Wisconsin, and Ohio, decreased from 5.53% to 5.03% between 2011 and 2015.

The Royal Bank of Canada's Blue Water Attitudes Survey, collected between 2007 and 2017, recorded the proportion of people in Canada who felt confident about the safety and quality of water at home. However, this survey relied on non-probability sampling methods. Therefore, any analysis of the data will lack external validity.

## DESCRIPTIVE SUMMARY OF DATA

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The 2018 IJC Binational Poll is arguably the best data with which to assess public perception of tap water in the Great Lakes region. This questionnaire states: **"I have access to clean, safe drinking water in my community,"** asking respondents to select their response on a Likert scale from strongly agree to strongly disagree or don't know. The results are striking: 18% of respondents disagreed or strongly disagreed with the statement. The data are presented by state/province in Table 1. Michigan has the highest reported disagreement at 30.8%. The IJC poll does not include data on race and ethnicity.

**Table 1. Responses by Jurisdiction to Question 3, 2018 IJC Binational Poll**

	Q3. I HAVE ACCESS TO CLEAN, SAFE DRINKING WATER IN MY COMMUNITY			
	STRONGLY DISAGREE / DISAGREE	NEITHER AGREE NOR DISAGREE	STRONGLY AGREE / AGREE	DON'T KNOW
Ontario	5.9%	15.1%	74.8%	4.2%
Minnesota	9.2%	18.3%	64.2%	8.3%
Wisconsin	13.4%	28.2%	53.4%	4.9%
Illinois	18.9%	18.4%	54.1%	8.5%
Indiana	17.1%	20.7%	57.9%	4.3%
Michigan	30.8%	18.7%	39.8%	10.7%
Ohio	22.4%	13.3%	56.0%	8.3%
New York	19.8%	11.2%	65.5%	3.6%
Pennsylvania	17.5%	21.7%	53.3%	7.5%

Question 4, the second trust-related question in the IJC survey, is, "My community provides clean, safe drinking water and treats wastewater at an affordable rate for all community members." In all jurisdictions except Pennsylvania, this statement has an even higher rate of disagreement than the prior statement, "I have access to clean, safe drinking water in my community," indicating perceived disparities in access to clean, safe, affordable drinking water. Again, Michigan has the highest rate of disagreement (32.2%).

**Table 2. Responses by Jurisdiction to Question 4, 2018 IJC Binational Poll**

	Q4. MY COMMUNITY PROVIDES CLEAN, SAFE DRINKING WATER AND TREATS WASTEWATER AT AN AFFORDABLE RATE FOR ALL COMMUNITY MEMBERS			
	STRONGLY DISAGREE / DISAGREE	NEITHER AGREE NOR DISAGREE	STRONGLY AGREE / AGREE	DON'T KNOW
Ontario	8.3%	19.8%	66.7%	5.2%
Minnesota	10.8%	21.7%	57.5%	10.0%
Wisconsin	14.4%	31.5%	48.2%	5.9%
Illinois	20.3%	20.8%	49.9%	9.1%
Indiana	17.9%	22.9%	54.3%	5.0%
Michigan	32.2%	20.3%	36.4%	11.0%
Ohio	24.0%	16.0%	50.9%	9.1%
New York	21.3%	14.7%	59.4%	4.6%
Pennsylvania	17.5%	26.7%	46.7%	9.2%

Notably, those of Native American or First Nations descent were much more likely to disagree or strongly disagree with both questions posed, which likely reflects long-term issues of water quality on tribal lands.

## OPTIONS FOR FURTHER ANALYSIS

### IJC Polling Data

Further analysis of this indicator is limited by the available data. There are some age and income statistics that can be calculated through the IJC poll, and some questions can be analyzed comparatively, such as type of water source and trust in tap water.

Additional analytical options will become available with the latest iteration of the IJC Poll, conducted in summer of 2021. The new poll includes better geographic and demographic information, along with different questions about trust in tap water. The additional questions on tap water, with Likert-scale responses, are:

- My tap water is safe to drink
- I trust my water utility/source of my water
- My tap water tastes good
- My tap water does not need to be filtered

Once these data are available, researchers can develop more precise estimates of consumer perceptions of water quality and affordability.

### Bottled Water Consumption

The amount of bottled water purchased is a potential indicator of trust in drinking water. Such an indicator can be assessed at the household or community level. For instance, a household-level measure can be the proportion of grocery expenses allocated to bottled water. A community-level measure can be the sales of bottled water per total sales. Our team requested bottled water statistics from a Michigan grocery chain, but we have not yet obtained the data. With bottled water consumption data, trends can be discerned and comparisons with water quality and affordability metrics can be developed.

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