

PFAS Body Burden and the Uneven Distribution of Industrial Chemical Exposure — summary

An evidence synthesis · Holistic Quality LLC

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Disclaimer. This is a research synthesis of the published scientific and government-monitoring literature. It is **not medical advice** and is **not peer-reviewed**. It summarizes the state of the evidence and cites its sources so readers can verify every claim. Associations described are **not** assertions of causation unless a cited source establishes one.

How this was produced. AI-assisted literature review and drafting, then **human-verified** — every figure was checked against a fetched primary or authoritative source (CDC/ATSDR, EPA, peer-reviewed journals), and any figure that could not be traced to such a source was reworded to what the source supports or removed. Where the evidence is contested or a figure is dated, that is stated.

The bottom line

Industrial chemicals are measurable in the bodies of essentially the entire US population, and the burden is **not evenly distributed**. The clearest case is per- and polyfluoroalkyl substances (PFAS): the CDC's National Health and Nutrition Examination Survey (NHANES) finds that **nearly all people in the United States have measurable PFAS in their blood**. These compounds persist because the carbon-fluorine bond is among the strongest in organic chemistry, so even after production phase-outs the majority of the population — including people born after those phase-outs — still carries detectable amounts. Exposure to polluting industrial facilities is, separately, patterned by race and income. The honest frame is **associational**: biomonitoring establishes **presence and distribution**, not individual causation. A faithful compression of the [full evidence review](#).

1. The biomonitoring record: exposure is measurable and near-universal

Since the 1999–2000 cycle, NHANES has measured serum PFAS in a nationally representative subsample aged 12 and older. The finding is unambiguous in the CDC/ATSDR's own words: **"Nearly all people in the U.S. have PFAS in their blood."** [1] An analysis of NHANES data from 1999 through March 2020 shows that while serum concentrations of several legacy PFAS have declined after production changes, the compounds remain widely detectable —

more than 96% of adolescents (some born after the early-2000s phase-outs began) had measurable legacy PFAS, and the weighted detection frequency was highest for PFHpS at **78.2%**. [2] The persistence is chemical: the carbon-fluorine bond is one of the strongest single bonds in organic chemistry, which is why PFAS are termed "forever chemicals." [3]

PFAS are one slice of a broader picture. The CDC's National Biomonitoring Program assesses the US population's exposure to a broad range of environmental chemicals in blood and urine; the consistent finding across chemical classes is that measurable exposure is ubiquitous — the open question is which chemicals and at what concentrations, not whether they are present. [4]

2. The exposure is not evenly distributed

Proximity to polluting industrial facilities tracks race and income. In a nationally representative analysis using the Americans' Changing Lives study geocoded against EPA's Toxics Release Inventory, **38.1% of Black respondents lived within one mile of a polluting industrial facility, versus 28.4% of white respondents**. After adjusting for income and education, Black respondents still had **1.38 times the odds** (OR = 1.38; 95% CI 1.10–1.72) of such proximity — that is, socioeconomic differences explain part but not all of the racial disparity. The gap is sharper regionally: 58% vs. 35% in Midwestern metros, and 30% vs. 14% in the suburban South. [5] The pattern recurs at hazardous-waste sites: in FY2022, roughly half of the population living within one mile of Superfund (National Priorities List) sites were people of color. [6]

3. Cancer Alley: the acute domestic case

The ~85-mile Mississippi River corridor between New Orleans and Baton Rouge — "Cancer Alley" — sits alongside some 200 fossil-fuel and petrochemical operations. [7] Louisiana statewide hosts over 300 manufacturing facilities, more than 150 petrochemical plants, and 15 refineries. [8] A 2025 study led by Johns Hopkins researchers, using *measured* ambient air concentrations rather than the EPA's modeled, industry-reported emissions, found the corridor concentrates the burden: it is only **12% of the state's land area but contains 45% of the facilities reporting air releases to the TRI and 57% of their mass emissions**. Measured cancer risks ran up to **11.6× higher than the EPA's 2020 AirToxScreen estimates (median ~5×)**, a gap the authors attribute largely to measured-vs-modeled ethylene oxide. Three compounds — ethylene oxide, chloroprene, and formaldehyde — together account for **63–96.9%** of estimated cancer risk across tracts, with ethylene oxide dominant. [9] In 2023 the EPA found "**significant evidence**" that Louisiana regulators' actions or inactions "have resulted and continue to result in disparate adverse impacts on Black residents" of the corridor (the agency later closed the investigation without binding action). [10]

4. What the evidence supports — and what it does not

Biomonitoring establishes that industrial chemicals are present in nearly everyone and that legacy PFAS persist despite phase-outs. It does **not**, by itself, establish that a given person's exposure caused a given disease. The proximity and cancer-risk findings are strong ecological and epidemiological associations, but they are vulnerable to unmeasured confounding (socioeconomic position above all), exposure misclassification (ambient vs. personal dose), and — for the corridor cancer estimates — the usual limits of modeled risk. The defensible synthesis: exposure is **ubiquitous, persistent, and inequitably distributed**, and the acute-corridor evidence is strong enough to warrant the regulatory attention it is beginning to receive, while individual causal and quantitative-attribution claims remain unsupported by this record.

How to cite

This page is the **summary brief**. The citable version of record is the **full evidence review** — please cite that:

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The full report — with the complete reference set and disclosures — is at holisticquality.io/research/pfas-body-burden-full; its version DOI ([doi:10.5281/zenodo.21181282](https://doi.org/10.5281/zenodo.21181282)) is the citable identifier for this work (the version-independent concept DOI is [doi:10.5281/zenodo.21181281](https://doi.org/10.5281/zenodo.21181281)).

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*All citations independently verified against their published sources (fetch-no-memory).
Health-effect statements reflect the cited source's own language; presence and distribution
are established, individual causation is not.*

Disclosures

Competing interests. The author is the founder and principal of Holistic Quality LLC, the commercial publisher of this brief, which develops regulator-facing safety-data and compliance products in areas that include environmental and chemical exposure; a sibling property (the Institute for Cognitive Sovereignty) may cite this work in public advocacy. To mitigate this competing interest, every claim and citation was independently source-verified, the limits of the evidence are stated throughout, and the author retained sole editorial control. **Funding:** none (self-funded). **Data availability:** synthesis of published and government-monitoring data; no new data. **AI use:** AI-assisted review/drafting, human-verified; the named author is responsible for all content. **ORCID:** 0009-0005-6946-3569. **Peer-review status:** self-published working paper; not peer-reviewed. Full disclosures are in the [full report](#).