

TITLE: Arsenic Drinking Water Violations Decreased Across the United States Following Revision of the Maximum Contaminant Level

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STUDENT SUBMISSION: Yes

TOPIC/TARGET AUDIENCE: This presentation is focused on public drinking water policy as relates specifically to arsenic contamination. Policy makers, public water consumers, drinking water system operators are all target audiences.

ABSTRACT: Arsenic poses a threat to public health across the globe, with known carcinogenic effects and widespread environmental prevalence. In 2001, the US EPA implemented the Final Arsenic Rule (FAR) for public drinking water, changing the maximum contaminant level (MCL) from 50 $\mu\text{g/L}$ to 10 $\mu\text{g/L}$. We investigated impacts of the FAR on drinking water violations temporally and geographically using the Safe Drinking Water Information System (SDWIS). Violations exceeding the MCL across the conterminous US from 2006 (onset of FAR enforcement) to 2017 and population served by violating systems were analyzed. The percentage of PWS violating declined from 1.25% in 2008 to 0.55% in 2017 ($p < 0.001$, slope = -0.070). The population served likewise decreased by over 1 million ($p < 0.00001$, slope = -106,886). Geographical analysis demonstrated higher mean violations and populations served were concentrated in certain counties rather than distributed across states. When considered with studies documenting decreased urinary arsenic levels in the population since the FAR, it may be inferred that the FAR is facilitating reduction of US arsenic exposures. Treatment appears to be a non-significant driver of these trends, but non-treatment methods (i.e. blending, switching sources) and reduced environmental releases may be contributing to the decline in violations.

OBJECTIVE(S): Identify the risks involved with ingestion of arsenic in drinking water.

Describe the impacts the Final Arsenic Rule has had on public water system violations for arsenic, as well as the public health implications.

Explain how treatment, environmental releases, and alternative methods are driving the violation trends.

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