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Featured Research Review:

Gonzalez, D. J. X., Nardone, A., Nguyen, A. V. et al., (2022). Historic redlining and the siting of oil and gas wells in the United States

February 16, 2023

Terms to know:

- HOLC grades—HOLC stands for Home Owners' Loan Corporation, which created maps in the 1930s that graded neighborhoods based on how risky they appeared to be for real estate investment.
- Redlining—Areas with predominantly low-income, immigrant, or black residents, which were seen as risky and mapped in red.
- Health disparities—Differences in burden of disease, violence, or injury that are preventable and experienced by disenfranchised populations.
- Retrospective assessment—A study that compares two groups of people based on information from the past, in this case those in lower-graded districts and those in higher-graded districts.
- Cross-sectional analysis—A type of study design that is observational in which researchers measure the outcome and the exposures in study participants at the same time.

It is understood that environmental problems are disproportionately impacting communities of color and low-income communities throughout the United States. However, it is less understood as to what has shaped these health disparities, especially around oil and gas development. The authors of the study "Historic redlining and the siting of oil and gas wells in the United States" (Gonzalez, D. J. X., Nardone, A., Nguyen, A. V. et al., 2022) set out to understand the process that shapes these health disparities and whether historic redlining played a role.

In the 1930s during the Great Depression, there was a desire to revive the housing market. The federal Home Owners' Loan Corporation (HOLC) analyzed neighborhoods and graded them on how risky they were for real estate investment. Neighborhoods that consisted of low-income individuals, immigrants, or black residents were seen as hazardous and mapped in red—leading to the name of *redlining*. A 2018

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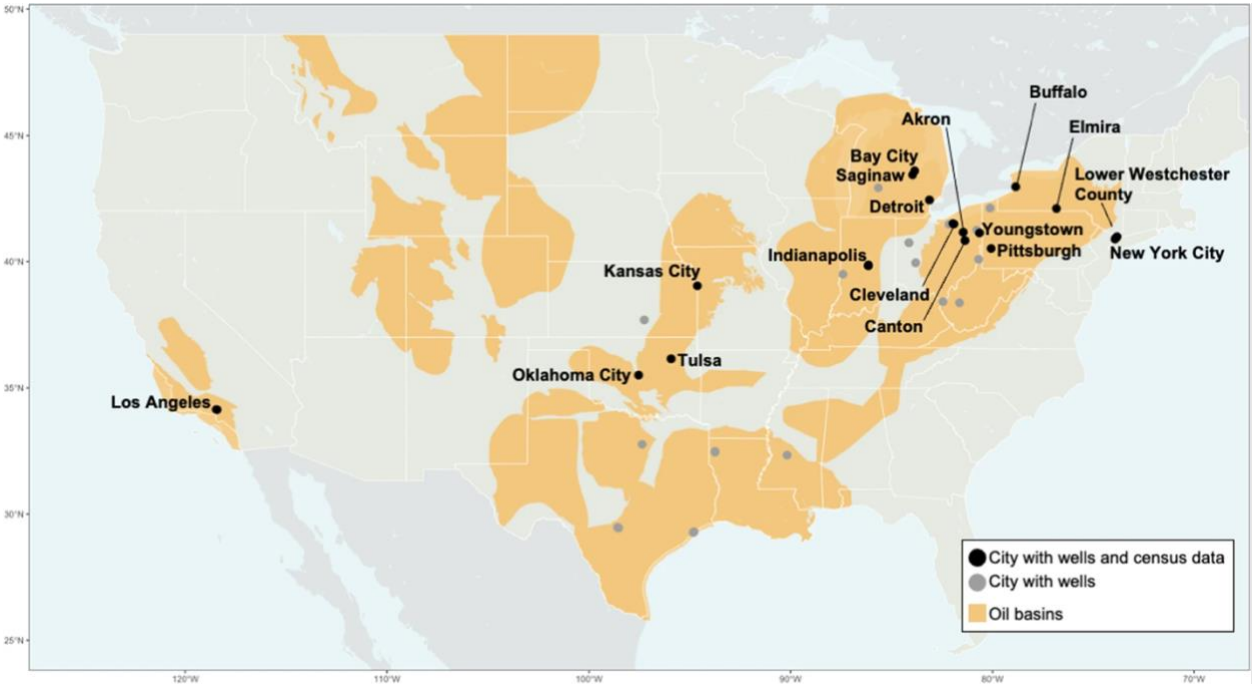
study out of Los Angeles found that officials explicitly considered the racial makeup of the neighborhood, as well as the presence of oil and gas development, in making these decisions.

The researchers used the HOLC maps from the Mapping Inequity Project at the University of Richmond and then collected data from the national dataset of oil and gas wells, which goes back to 1898. They completed a retrospective assessment looking at the HOLC grade and the presence of wells in 33 different U.S. cities. They also completed a national cross-sectional analysis looking at the association between HOLC grades and well sites drilled at any time since record keeping began. Ultimately, they were looking to determine whether worse HOLC grades were associated with exposure to more oil and gas wells.



Map shows all the cities that were included in the study with 10 or more wells that were within 100 meters of neighborhoods appraised by HOLC. All the cities included in the study were appraised by HOLC and census tract-level data from the 1940 census were available for a subset of 17 cities. Courtesy of Gonzalez, D. J. X., Nardone, A., Nguyen, A. V. et al.

The results of this study showed:

- In 33 cities within 13 states, there were 2,497 HOLC-graded neighborhoods, and of those neighborhoods, 735 were exposed to at least one well.
- Tract-level census data was available for 60 cities in 25 states; there were 3,408 HOLC-graded neighborhoods of which 17 had at least ten wells (see map above).
- Across all the cities, worse HOLC grades were associated with more wells:
    - HOLC grade A had 647 wells
    - HOLC grade B had 2,581 wells
    - HOLC grade C had 5,051 wells
    - HOLC grade D had 6,288 wells
- In cities like Los Angeles and Oklahoma City, most wells were in D-graded neighborhoods. In San Antonio and Cleveland, neighborhoods with C grades had the most wells.

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This study confirmed that the more wells and higher mean density of wells in neighborhoods corresponded with worse HOLC grades overall. Redlined neighborhoods have nearly twice the density of oil and gas wells as compared to neighborhoods that were not redlined.

To learn more about this study, explore these links:

1. Cumming, D. G. (2018, March 1). *Black Gold, White Power: Mapping Oil, Real Estate, and Racial Segregation in the Los Angeles Basin, 1900-1939 | Engaging Science, Technology, and Society*. https://estsjournal.org/index.php/ests/article/view/212
2. González, D. J. X., & Morello-Frosch, R. (2022, May 26). *Redlining and environmental injustice*. EHN. https://www.ehn.org/environmental-justice-oil-and-gas-2657292130/redlining-and-environmental-injustice
3. Gonzalez, D. J. X., Nardone, A., Nguyen, A. V., Morello-Frosch, R., & Casey, J. A. (2022). Historic redlining and the siting of oil and gas wells in the United States. *Journal of Exposure Science & Environmental Epidemiology*, *33*(1), 76–83. https://doi.org/10.1038/s41370-022-00434-9
4. Johnston, J. E., Werder, E., & Sebastian, D. (2016). Wastewater Disposal Wells, Fracking, and Environmental Injustice in Southern Texas. *American Journal of Public Health*, *106*(3), 550–556. https://doi.org/10.2105/ajph.2015.303000
5. National Resources Defense Council. (2014). Drilling in California: Who's at risk? In *https://catskillcitizens.org/files/learnmore/california-fracking-risks-report.pdf*. Retrieved February 16, 2023, from https://catskillcitizens.org/files/learnmore/california-fracking-risks-report.pdf

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