Water and Sewer Affordability: An Insight into Water Equity in Allegheny County

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Rationale
Affordable water is recognized by the United Nations as a fundamental human right.

Households experience limited access to drinking water and sanitation due to affordability problems rather than infrastructural inaccessibility.

Consequences of water unaffordability include the risk of losing health, home, children, family, and freedom.

Residents throughout Allegheny County are experiencing steady water and sewer rate increases, impacting vulnerable customers.

Objectives
The objectives of this research are as follows:

- Quantify water/sewer affordability in the boroughs served by ALCOSAN in Allegheny County
- Identify boroughs where water/sewer may be unaffordable
- Identify possible correlates of unaffordability

Method
Two complimentary metrics were used in this study to quantify water/sewer affordability:

Affordability Ratio (AR)
The percentage or ratio of basic water and sewer costs to disposable household income for low-income customers

\[
AR = \frac{(W + S)}{(I - E)}
\]

where
- \(W\): cost of essential water services
- \(S\): cost of essential sewer services
- \(I\): household income
- \(E\): essential household expenses

Hours at Minimum Wage (HM)
The hours at minimum wage needed to pay for the monthly water and sewer costs

\[
HM = \frac{(W + S)}{A}
\]

where
- \(W\): cost of essential water services
- \(S\): cost of essential sewer services
- \(A\): minimum wage in labor market

Scope
The AR and HM metrics were calculated for 80 boroughs in Allegheny County served by Allegheny County Sanitary Authority (ALCOSAN)
Why these metrics?

1. Measure household affordability
2. Address basic water needs
3. Focus on low-income households
4. Account for essential costs other than water/sewer

What defines affordability?

- This research does not define affordability
- Affordability is unique to each community and based upon their needs/values
- A specific AR value may be considered affordable in one community and unaffordable in another

Figure 1
AR Values by Borough
Higher AR values indicates more unaffordability
Findings

Large range of AR and HM values for the 80 boroughs studied
Braddock has the highest AR value of all the boroughs at 38.75% and Thornburg has the lowest AR value at 2.56%. The r-squared value for a regression between the AR and HM values is only 0.08, indicating that the AR does not directly correlate to the HM.

Affordability for boroughs that use the same water authority
The AR values were compiled by water authority, and the descriptive statistics were calculated. There was a large range of AR values for each of the water authorities. In other words, there was no consistency for borough affordability within any individual water authority. This indicates that affordability is very dependent on the characteristics specific boroughs.

Affordability Correlation
The AR values were correlated with demographic and socioeconomic data from all the boroughs. The Gini Coefficient, a measure of income inequality, and median income showed to be predictors of affordability. As the Gini Coefficient increases, water/sewer become less affordable. As median income increases, water/sewer become more affordable.

Takeaways
- Boroughs with high ARs and HMs were identified
- Affordability is not solely dependent on water/sewer rates
  - Correlates of affordability in Allegheny County include the Gini coefficient (+) and median income (-)
  - The 12 boroughs with AR values above 20% (least affordable) are in the lowest 30th percentile of income with respect to the income of all boroughs in this study

- This research does not define affordability. Instead, it quantifies affordability metrics that can be used by local leaders as a grounding point to assess the affordability landscape.