



Multimorbidity Among Adults in the Flint Registry with Kidney Disease

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Introduction

- 2014 Flint water switch exposed ~100,000 residents to lead-contaminated drinking water.¹
 - Leading to the creation of the **Flint Registry** to track long-term health recovery.
- Flint Registry participants show 8.1% age-adjusted kidney disease prevalence vs. 3.4% statewide.¹
- Upwards of 86% of primary care CKD patients present with co-occurring chronic conditions.²
- Lead is an established nephrotoxin, but the interaction between lead exposure, self-reported kidney disease, and overall multimorbidity remains poorly characterized.^{3,4}
- Guided by community advocacy, this study evaluates associations between kidney disease, multimorbidity, and demographic factors (N = 10,134).

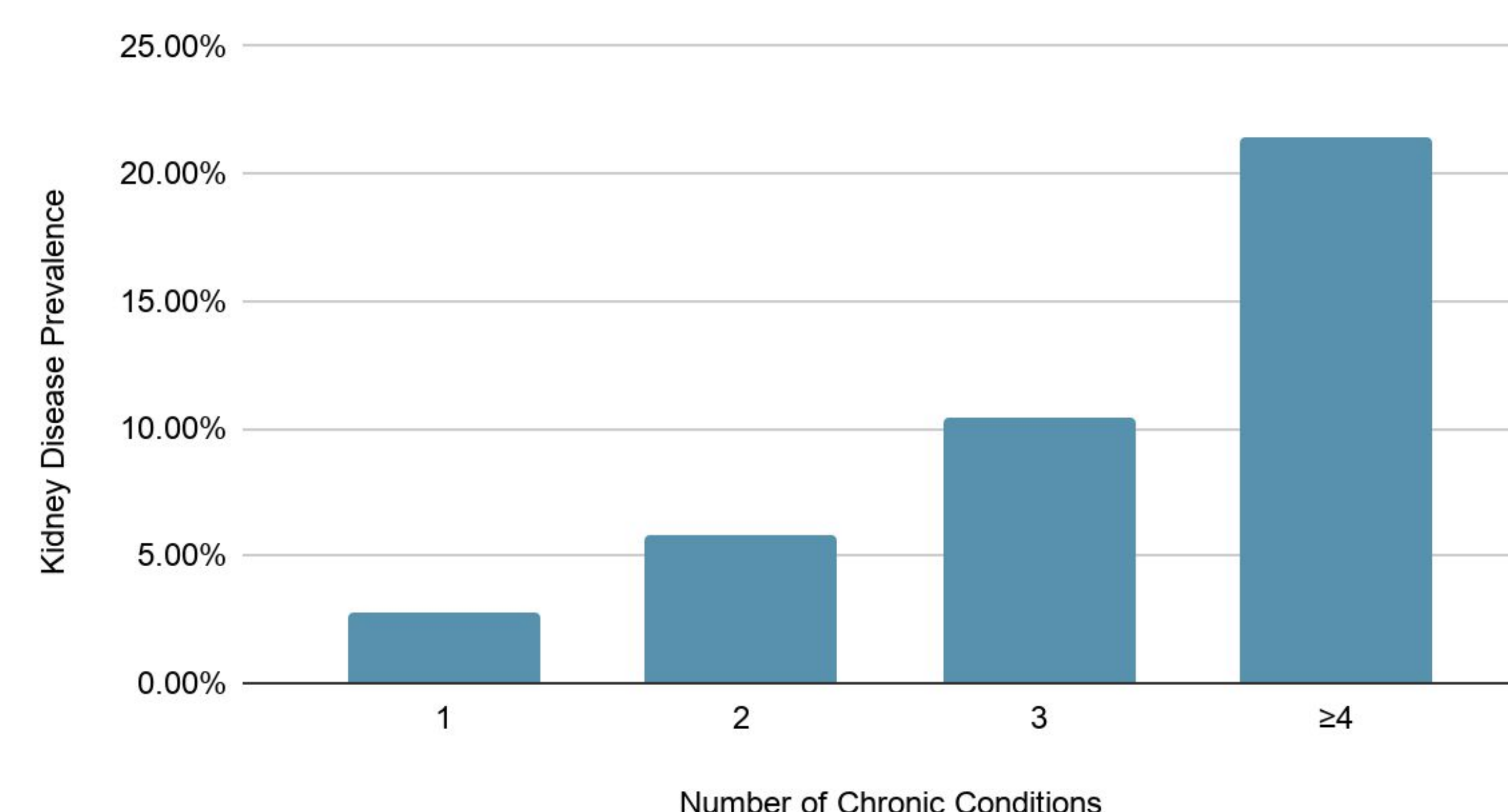
Methods

- This cross-sectional study evaluated adult participants (≥18) enrolled in the Flint Registry.
- Multimorbidity was defined as the presence of 1 or more self-reported chronic health conditions.
- Descriptive statistics were performed to characterize and compare multimorbidity patterns, exposure duration, and socioeconomic status between participants with and without kidney disease.

Results

- Among 10,134 adult Flint Registry participants, 10.1% reported a diagnosis of kidney disease and 69.7% experienced multimorbidity (≥1 chronic condition).
- Kidney disease prevalence scaled steeply with cumulative comorbidity burden (Figure 1):
 - 1 Condition: 2.8%
 - 2 Conditions: 5.8%
 - 3 Conditions: 10.4%
 - ≥4 Conditions: 21.4% (nearly 8x higher than single-condition baseline)
- Kidney disease was nearly 3x more common in older adults (16.8% among ≥65 vs. 5.7% among <45).
- Residing in Flint for the full 18-month water crisis was associated with higher kidney disease prevalence (10.8%) compared to shorter residency (7.4%).
- Significant socioeconomic disparities were observed across income and education:
 - Income: 10.9% in households earning <\$50,000 vs. 5.9% earning ≥\$50,000.
 - Education: 10.7% among non-college graduates vs. 7.4% among college graduates.

Figure 1: Kidney Disease Prevalence by Comorbidity Burden



Conclusions

- Strong association between cumulative multimorbidity burden and kidney disease within a population exposed to an environmental disaster.
- Supports shifting primary care from single-disease management to integrated, multi-system screening.
- Clinically, these data support implementing multi-system screening and treatment protocols for patients in environmental health recovery settings.
- Findings also highlight the imperative for sustained funding for targeted secondary prevention and chronic disease mapping in under-resourced communities.
- Ongoing community partner collaboration aims to map specific chronic disease clusters and identify the highest-risk individuals requiring targeted intervention.
- Establishes a baseline for longitudinal tracking of physical and psychological health outcomes of patients affected by this environmental disaster.

References

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