Five Projects Using Social Media as an Early Warning System for the Opioid Epidemic

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Why Track the Opioid Epidemic?

- The opioid epidemic persists in the United States, with over 70,000 deaths annually since 2020 [1-2]
- Rapidly changing dynamics of non-medical opioid use, and variation across geographies and demographics, require reliable and timely information to monitor and address the crisis

Why Social Media?

- Academic and government surveys are standard practice for tracking opioid usage patterns
- Survey reliability is limited by reliance on self-reporting of stigmatized behavior [3]
- Surveys and overdose death tallies can take months to years to complete, making real-time monitoring of quickly evolving trends difficult
- Social media platforms include billions of user-generated posts that offer a less-filtered window into the relationship between individuals and their use of drugs, accessible in near real-time
- Previous work has established social media as a viable source to track opioid use and opioid-related mortality [4-6]

Project 1: Opioid Discussion on Reddit Correlates with Overdose Death Rates

Project lead: DAS

Project 2: Reddit Topic Modeling Informs Digital Ethnography

Project lead: DAS, ATN

Project 3: Topic Modeling Reveals Differential Trends in Public Discourse

Project lead: ATN

Project 4: A Variety of Diverse Social Platforms Have Opioid-Related Content

Project lead: KAC

Project 5: Large Language Models Aid Identification of Opioid-Related Content

Project lead: KAC

Why the media platforms used in existing studies lack a comprehensive list of terms related to opioids

Table 1. Characteristics of 11 social media platforms that are factors in utility for tracking the opioid epidemic.

- Platform Name: Twitter, Facebook, LinkedIn, Reddit, X (Twitter), TikTok, UnRestricted
- Opioid-related Terms: Yes, No, Not reported
- Yes (is relevant)
- No (is not relevant)
- ContentRestriction
- TOTAL

Table 2. Confusion matrix of GPT4 classification versus human annotation of "fentanyl" as a slang term for fentanyl in a set of 492 tweets from September 2022. Accuracy = 99.3%, sensitivity = 90.9%, specificity = 100.0%, PPV = 100.0%.

REFERENCES