Automatically Identifying Twitter Users for PrEP-Related Interventions

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Background

- Pre-exposure prophylaxis (PrEP) is highly effective at preventing the acquisition of HIV[1]. There is a substantial gap, however, between the number of people in the United States who have indications for PrEP and those who are prescribed PrEP[2].
- Although Twitter content has been analyzed as a source of PrEP-related data (e.g., barriers), methods have not been developed to enable the use of Twitter as a platform for implementing PrEP-related interventions.

Objectives

- Men who have sex with men (MSM) are the population most affected by HIV in the U.S.[3] Therefore, the objectives of this study were to (1) develop an automated natural language processing (NLP) pipeline for identifying men in the U.S. who have reported on Twitter that they are gay, bisexual, or MSM; and (2) assess the extent to which they demographically represent MSM in the U.S. with new HIV diagnoses.

Conclusions

- Our automated pipeline can be used to identify MSM who are largely in the regions and age groups most affected by HIV in the U.S., laying the groundwork for using Twitter on a large scale to directly target PrEP-related interventions at this population.

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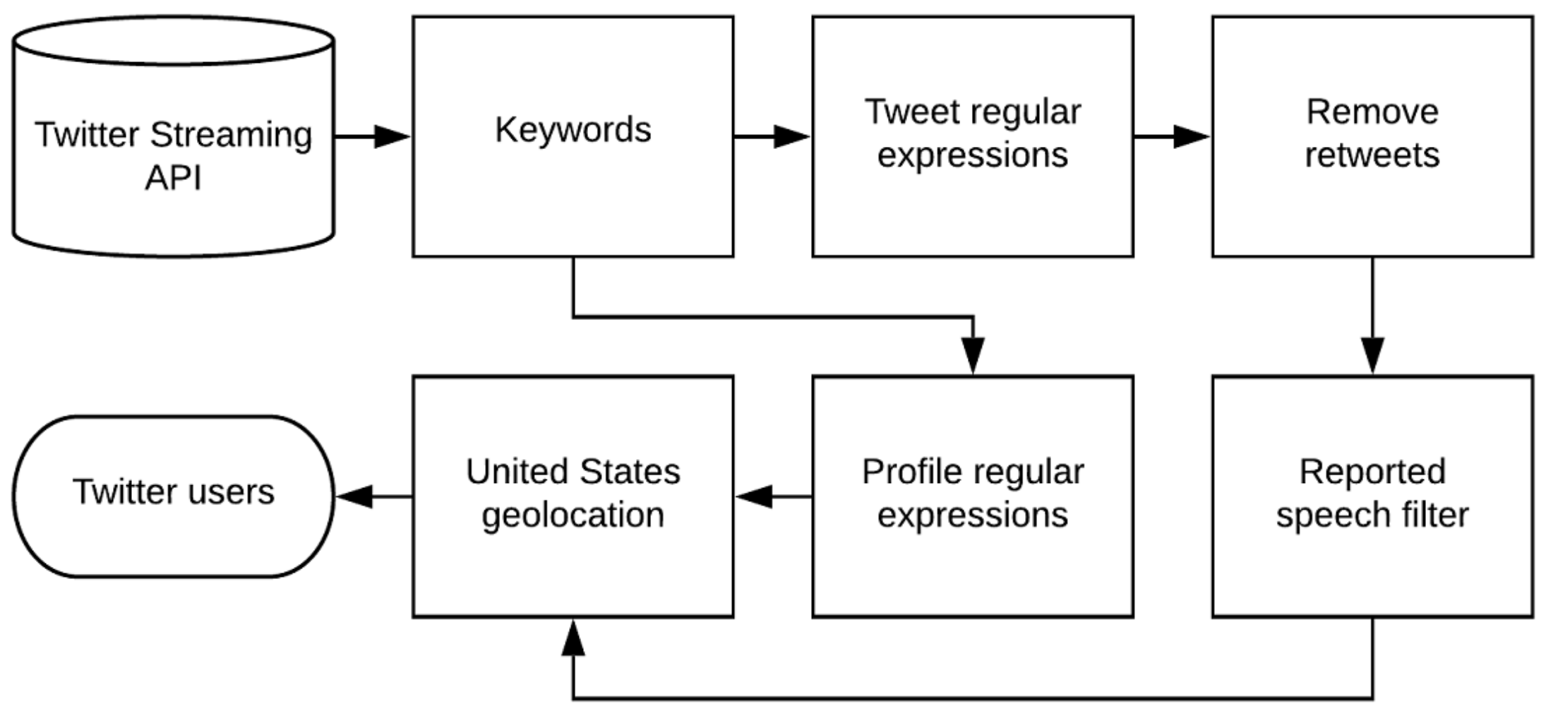
Methods

- *Pipeline*. Between September 2020 and January 2021, we identified 10,043 users.



Twitter Streaming API → Keywords → Tweet regular expressions → Remove retweets → Reported speech filter → Profile regular expressions → United States geolocation → Twitter users

- *Evaluation.* Two annotators distinguished true- and false-positive self-reports in a sample of 500 tweets and 500 profiles of the 10,043 identified users.

Tweet	End the FDA's discriminatory and unscientific policy against gay men like me donating blood.	+
Tweet	Today, we remember Matthew Shepard who's life was cut short as a result of a hate crime due to his identity as a gay male.	-
Profile	A proud black gay guy.	+
Profile	50+ gay trans man, writer, film and food lover. He/him OR they/them.	-

- *Demographics.* We used Carmen[4] and ReportAGE[5] to automatically identify the geolocation and age, respectively, of the 10,043 identified users.

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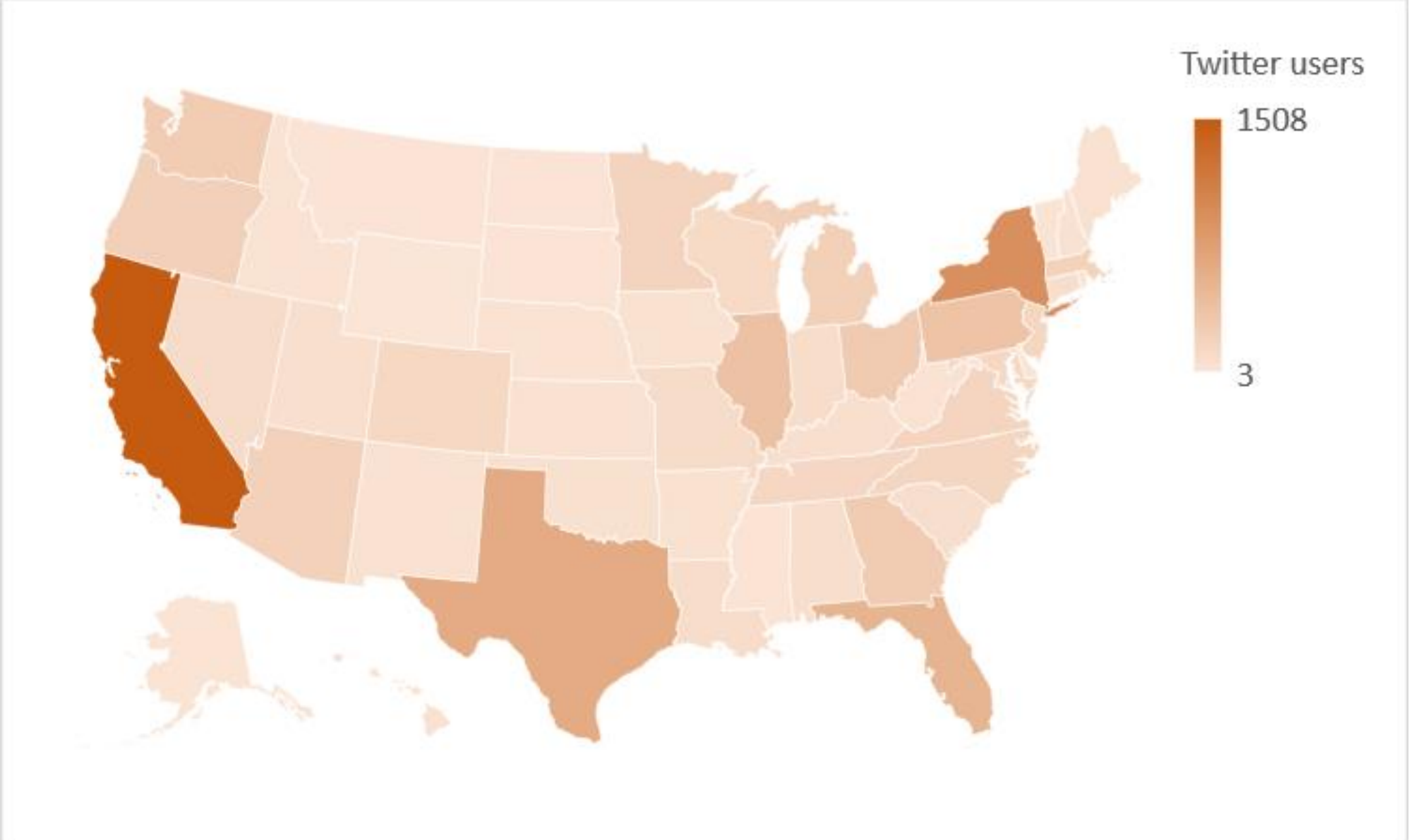
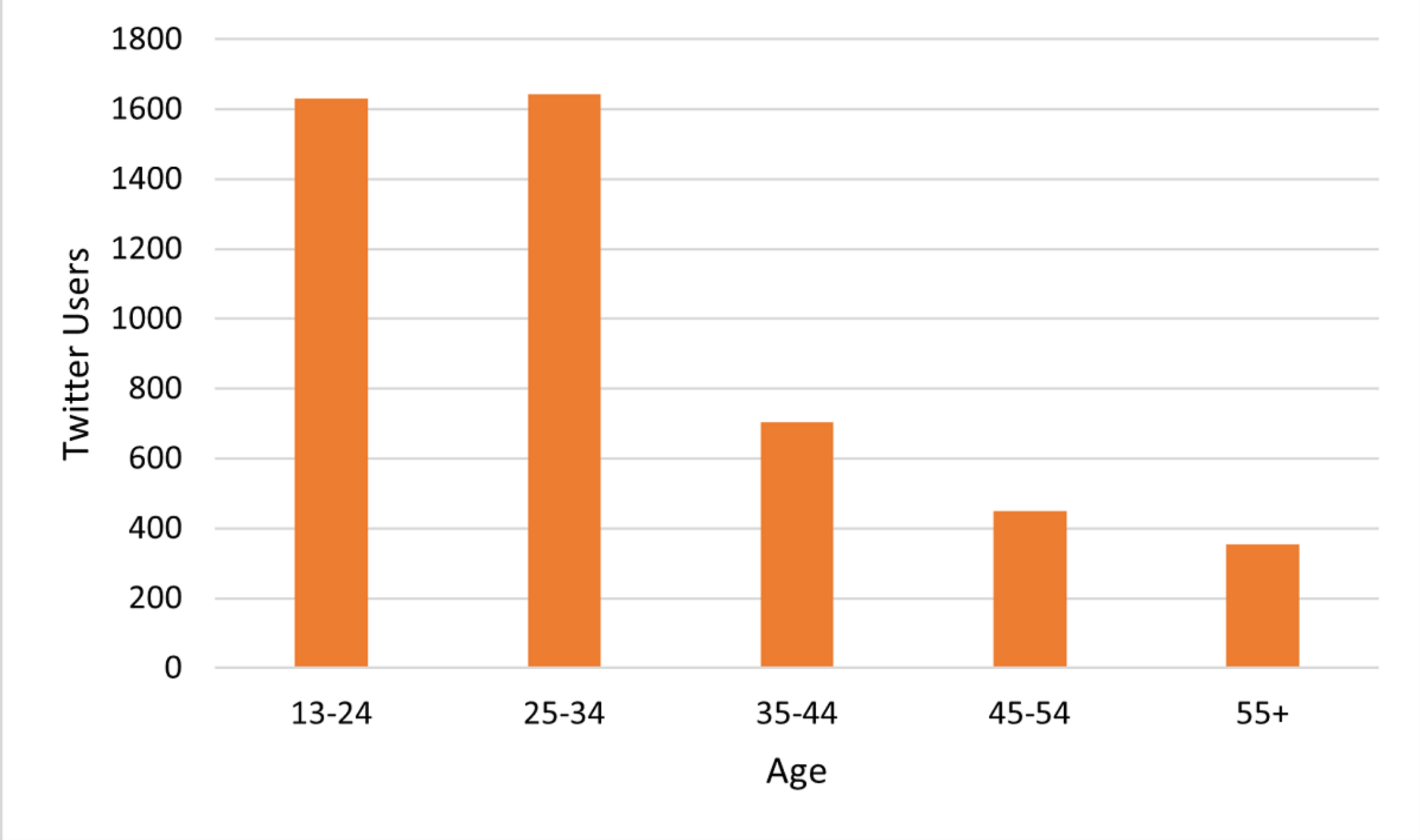
Results

- *Evaluation.* Among 1,000 of the 10,043 identified users, 417 (83.4%) of their 500 tweets and 430 (86%) of their 500 profiles were annotated as true positives, establishing an overall precision of 0.85.
- *State-level geolocation.* We detected a state-level geolocation for 8,756 (87.6%) of the 10,043 identified users. Among these 8,756 users, 5,096 (58.2%) were in the 10 states with the highest numbers of new HIV diagnoses[3].



- *County-level geolocation.* We detected a county-level geolocation for 6,240 (71.2%) of the 8,756 users for which we detected a state-level geolocation. Among these 6,240 users, 4,252 (68.1%) were in counties or states considered priority jurisdictions by *Ending the HIV Epidemic*[6].
- *Age.* We detected an age of ≥13 years for 4,782 (47.6%) of the 10,043 identified users. The majority of the users are in the same two age groups as the majority of MSM with new HIV diagnoses.



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