INTRODUCTION

The Internet hosts many unregulated marketplaces for otherwise regulated products.\(^1\,\,^2\) If extended to marijuana (or cannabis),\(^3\) online markets can undermine both the U.S. Controlled Substances Act, which bans marijuana sales, and the regulatory regimes of states that have legalized marijuana. Consequently, regardless of the regulatory regime, understanding the online marijuana market should be a public health priority. Herein, the scale and growth trajectory of the online marijuana marketplace was assessed for the first time by analyzing aggregate Internet searches and the links searchers typically find.\(^4\)

METHODS

First, the fraction of U.S. Google searches including the terms marijuana, weed, pot, or cannabis relative to all searches was described monthly from January 2005 through June 2017 using data obtained from Google. Searches were also geotagged by state (omitting Alaska, Montana, North Dakota, South Dakota, Vermont, West Virginia, and Wyoming because of data access restrictions). The subset of shopping searches was then monitored by tracking queries that also included buy, shop, and order (e.g., buy marijuana) in aggregate. Searches that included killer, cooking, or clay (e.g., weed killer) were considered unrelated and excluded from all analyses.

Linear regressions were used to compute pooled means to compare between time periods and log-linear regressions were used to compute average growth. Raw search volumes were estimated based on total Google search volume using comScore (www.comscore.com).

Searches in a Google Chrome browser without cached data were executed during July 2017 using the 12 combinations of marijuana and shopping root terms (i.e., buy marijuana). The results would be indicative of a Google user’s typical search results. The first two pages of links, including duplicates (N=279, with seven to 12 links per page), were analyzed (because nearly all searchers click a link on the first two pages, with as much as 42% selecting the first link\(^5\)). Investigators recorded whether each linked site advertised mail-order marijuana (excluding local deliveries in legal marijuana states) and its order in the search results. Two authors agreed on all labels. Analyses were computed using R, version 3.4.1.

RESULTS

Marijuana searches grew 98% (95% CI=84%, 113%) as a proportion of all searches from 2005 through the partial 2017 year (Figure 1). The subset of marijuana searches indicative of shopping grew more rapidly over the same period (199%, 95% CI=165%, 243%), with 1.4–2.4 million marijuana shopping searches during June 2017.

Marijuana shopping searches were highest in Washington, Oregon, Colorado, and Nevada. The compounding annual growth rate for marijuana shopping searches since 2005 was significantly positive (\(p<0.05\)) in 42 of the 44 studied locations (all but Alabama and Mississippi), suggesting demand is growing across the nation.

Forty-one percent (95% CI=35%, 47%) of shopping search results linked to retailers promising mail-order marijuana (Table 1). Retailers occupied 50% (95% CI=42%, 59%) of the first page results and for eight (of 12) searches, the first link led to a mail-order marijuana retailer. For some searches (e.g., order marijuana), all of the first-page links were marijuana retailers.

DISCUSSION

Millions of Americans search for marijuana online, and websites where marijuana can be purchased are often the top search result. If only a fraction of the millions of searches and thousands of retailers are legitimate, this online marketplace poses a number of potential public health consequences.\(^6\) Children could purchase marijuana online. Marijuana could be sold in states that do not currently allow it. Initiation and marijuana
Online sales—yet the market appears to be thriving. Government agencies might work with Internet providers to purge illicit marijuana retailers from search engines, similar to how Facebook removes drug-related pages. Moreover, online payment facilitators could refuse to support marijuana-related online transactions.

This study was limited in that who is buying/selling and the quantity of marijuana exchanged cannot be measured. Further, some searches may be unrelated to seeking marijuana retailers, and some retailers may be illegitimate, including scams or law enforcement bait.

The volume of searches and placement of marijuana retailers in search results is a definitive call for public health leaders to address the previously unrecognized dilemma of online marijuana.

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