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Research Article

Measuring online interest in health insurance exchange implementation

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Abstract

Background: The federal government spent approximately $3.6 billion to establish and promote health insurance exchanges. However, there has been limited assessment of public interest in health insurance exchanges, which could inform effective outreach campaigns to encourage enrollment moving forward.

Methods: We used difference-in-difference analysis and also retrospectively measured relative search interest for the federal programs to evaluate temporal trends in online search interest for health insurance exchange implementation in comparison to implementation of other federal programs. We examined online search query data from Google Trends, a web-based resource for tracking Google search queries. We used aggregated online search volume for query terms over a specified time, normalized against total search volume over that period. Our primary outcomes were the difference-in-difference coefficients for relative search interest in 6 regression models comparing the implementation and post-implementation periods for the federal programs. Our secondary outcomes were return to baseline of search interest for these programs, and changes in search interest for the final month of open enrollment for the health insurance exchanges and Medicare Part D.

Results: Difference-in-difference estimates of search interest associated with the health insurance exchanges were lower than Medicare Part D (p<0.01), Myplate (p<0.01), and first time home buyer (p<0.01) search queries. No significant differences existed between the difference-in-difference coefficients for the models comparing the other federal programs. Relative search interest returned to baseline more quickly for the health insurance exchanges than for the other programs. In the final month of open enrollment, there was a 72% increase in search interest for Medicare Part D, compared to a 186% increase for the health insurance exchanges.

Conclusion: Online search interest in health insurance exchanges was significantly lower in the immediate implementation period than in the three other federal programs, but sharply increased in the final month of open enrollment. Monitoring online search interest may offer leading information about health insurance exchange outreach efforts.

Introduction

In October 2013, health insurance exchanges created by the Patient Protection and Affordable Care Act (ACA) opened to the public [1]. The federal government spent approximately $3.6 billion to establish, implement, and promote health insurance exchanges [2]. For health insurance exchanges to control premium cost, it is critically important to ensure adequate enrollment to avoid the adverse selection of only high-risk enrollees that disrupt actuarial estimates for the pricing of exchange policies. However, there has been limited assessment of public interest in health insurance exchanges after their implementation, creating an important knowledge gap concerning the effectiveness of outreach campaigns to encourage enrollment.

Online search queries have emerged as novel measures for analyzing public interest [3,4], and may be particularly relevant for healthcare topics given that 77% of individuals seeking health-related information start with an Internet search engine [5]. This methodology may be especially useful for understanding interest in health insurance exchanges, which were designed to be primarily accessed through the Internet. Enrollment in health insurance exchanges initially lagged behind projected goals, but surged at the end of the open enrollment period to exceed the goal of seven million individuals by March, 2014

[6]. Nearly one half of all enrollees signed up in the month of March [6]. It remains unknown, however, whether there is a relationship between online search interest and actual enrollment, and whether measuring search queries may act as a leading indicator for meaningful public interest in health insurance exchanges.

Accordingly, we sought to evaluate temporal trends in online search interest for health insurance exchanges. We compared these trends with online search interest associated with other recently introduced federal initiatives, in order to better understand the potential effectiveness of current health insurance exchange-associated outreach efforts in the immediate post-implementation period. As adequate enrollment is critical to the success of health insurance exchanges, using online search interest to understand actual enrollment may offer a strategy to gauge outreach efforts.

Methods

We analyzed online search query data from Google Trends (Google Inc., Menlo Park, CA, USA; http://www.google.com/trends/) , a web-based resource for tracking Google search queries. These data represent "relative search interest" values, i.e. online search volume for a particular query term over a given time period normalized against total search volume over the same period [7]. The derivation of Google Trends relative search interest values and their application for research purposes has been previously described in detail [6]. We compared temporal trends in relative search interest associated with four major federal programs: health insurance exchanges, Medicare Part D, Myplate (a diet initiative of the Department of Agriculture Food Guidance System which replaced the "food pyramid"), and the first time homebuyer tax credit. The latter three programs were chosen given the extensive public outreach efforts associated with their roll out, enabling historical comparison with the recent online introduction of health insurance exchanges. We studied the immediate implementation period as well as post-implementation periods for each program. All analyses were performed using Stata SE 13.1 (StataCorp, College Station, TX), and all statistical tests were 2-tailed with alpha equal to 0.05.

Analysis of implementation period

We obtained weekly relative search interest estimates for each federal program corresponding to: (1) the week containing the day of official program roll out, (2) 18 weeks prior to the week of program roll out, and (3) 18 weeks following the week of program roll out. These time periods were chosen *a priori*, based on the periods of increased online interest in the other programs. We used the Google Trends "topics" search feature, which captures related search terms for a limited number of queries [8], for relative search interest data pertaining to health insurance exchanges. We used the search terms "Medicare Part D," "Myplate" and "first time home buyer" to obtain data for those programs, respectively. We restricted all searches to "United States" geography and the "health" category as appropriate using Google Trends search filters.

We compared temporal trends in relative search interest for each federal program using difference-in-difference analysis as well as measurement of time until return to baseline for search interest. Specifically, for the difference-in-difference analysis, we used ordinary least squares linear regression to assess relative search interest in the 18 weeks prior to program roll out compared to the 18 weeks following program roll out. In this manner, we estimated difference-in-difference coefficients for relative search interest in 6 regression models: (1) health insurance exchange versus Medicare Part D, (2) health insurance exchange versus Myplate, (3) health insurance exchange versus first time home buyer, (4) Medicare Part D versus Myplate, (5) Medicare Part D versus first time home buyer, and (6) Myplate versus first time home buyer. We used the generalized Hausman specification test to compare difference-in-difference coefficient estimates across all regression models.

Analysis of post-implementation period

In order to determine the time until return to baseline for search interest, we first assigned the baseline relative search interest as that value occurring 12 weeks prior to the search peak for each federal program. We then calculated the number of weeks from the search peak to the earliest week in which relative search interest was equal to or less than this baseline value. Finally, we measured whether there was an increase in the level of online interest in the final month of the open enrollment periods for the health insurance exchanges as well as Medicare Part D through calculating the percent change in interest for the four weeks prior to the end of enrollment. We did not measure increase in online interest for Myplate or first time home buyer because these programs had interest that remained above baseline.

Results

Relative search interest for each program peaked in the week corresponding to date of program roll out (Figure 1). Difference-in-difference estimates of relative search interest associated with health insurance exchanges were significantly lower compared to Medicare Part D (p<0.01), Myplate (p<0.01), and first time home buyer (p<0.01) search queries. By contrast, no significant differences in post-estimation difference-in-difference coefficients were observed for regression models comparing Medicare Part D versus Myplate, Medicare Part D versus first time home buyer, or Myplate versus first time home buyer.

For health insurance exchanges, search interest returned to baseline 16 weeks after peak interest. Medicare Part D relative search interest returned to its baseline 32 weeks after its peak, and first time homebuyer interest returned to baseline after 91 weeks. Myplate relative search interest remained elevated and did not return to baseline.

At the end of the open enrollment period for Medicare Part D, there was a 72% increase in online interest in the four weeks prior to the end of enrollment on May 15, 2006 (Figure 2). For the health insurance exchanges, there was a 186% increase in relative search interest during the final month at the end of open enrollment on March 31, 2014 (Figure 3).

Discussion

Since health insurance exchanges are inextricably linked to the Internet, online search interest in exchanges may represent an important surrogate measure of ongoing public engagement in these programs. Our results indicate that online search interest in health insurance exchanges was significantly lower in the immediate implementation period compared to three other major federal programs, each of which had sustained online interest following their respective roll-out periods. Medicare Part D, in particular as a similar healthcare benefit program, had sustained online search interest for twice as long as health insurance exchanges. However, the health insurance exchanges had a spike in interest at the end of open enrollment that was much greater than the relative increase in online interest at the end of enrollment for Medicare Part D in 2006.

These findings suggest that public education and communications efforts associated with health insurance exchanges may not have effectively translated into increased online information-seeking behaviors among potential exchange enrollees in the immediate implementation period. However, enrollment in health insurance exchanges rose significantly in the last month of the open enrollment period, increasing from four to eight million people by March 31, 2014 [6]. An important contributing factor to this increase in enrollment is the intensified online outreach for the health insurance exchanges in the final month of enrollment [9], which was also reflected in increased relative search interest during the month of March. As such, several actionable opportunities exist for future strategies to optimize enrollment moving forward.

Broaden outreach strategies

Innovative and diverse outreach strategies could be utilized to

improve public awareness of the exchanges. For example, the Medicare Part D program roll out involved a multi-faceted approach that included numerous public appearances of leaders from the Department of Health and Human Services, a Medicare Part D "bus tour" that covered over 600,000 miles to interact directly with local communities and consumers [10], and substantial mass media advertising. Of course, the world has changed significantly since 2005, with marked by increased access to and penetration of the Internet coupled with the rise of numerous web-based (and ever evolving) social media platforms. Optimizing online interest in health insurance exchanges may require more intensive efforts in these digital domains, in addition to the traditional venues of printed newspapers and magazines, radio, and television. The push by the Obama administration in the final month of open enrollment to use these digital domains to engage a broader audience likely contributed to the surge at the end of open enrollment [9].

Emphasize value and promote trust

Two elements of successful online commerce that can guide purchasing behaviors deserve greater consideration: perception of value and trust [11]. A Kaiser Family Foundation poll from January 2014 showed that 46% of the uninsured were unaware of provisions for financial assistance to low and moderate income individuals [12]. Improving the public perception of value in this program is necessary to motivate online interest in procuring health insurance, since individuals are less likely to spend time, money, and energy to buy products they deem of little worth.

While the continued politicization of the ACA creates major perceptual hurdles, federal and state administrations could use digital awareness campaigns to underscore the financial assistance in the exchanges and provide links to online resources that help increases the public's knowledge and understanding of the personal finance and healthcare access features for each consumer. Additionally, recognizing that trust in the health insurance exchanges was hampered by online glitches in the beginning of the roll out of the federal website, specific messaging may be needed moving forward to highlight the numerous successes of state-based and federal exchanges. Outreach could include increased testimonials of actual exchange customers, in-person demonstrations of the enrollment process, social media through resources such as Twitter or embedded website messaging, as well as endorsements by high profile figures in other sectors such as entertainment.

Monitor online search interest

If subsequent enrollment patterns follow the online search interest trends identified in this work, this approach may prove a useful tool for policymakers and government officials seeking to continuously gauge and evaluate outreach efforts. The ability to use publicly available resources such as Google Trends to track online interest offers an efficient and cost-effective way to evaluate what works—and what doesn't—in generating interest in health insurance exchanges. This may offer leading information that could allow quick responsiveness for outreach and communications efforts.

Our study has several limitations. First, it is ecologic by design, and we cannot account for individual-level confounders related to online searches, including direct access of health insurance exchange websites. We also used difference-in-difference analysis to compare different before and after period for the programs we evaluated, and we cannot adjust for unknown secular trends associated with the roll out of specific federal programs. Second, our results capture all online search interest for health insurance exchanges, which includes queries from individuals who may be seeking information or opinions critical of exchanges, and thus we cannot precisely distinguish online information-seeking behaviors positively aligned with prospective interest in enrollment. Nevertheless, numerous previous studies have used relative search interest values from Google Trends to accurately monitor public interest across several healthcare topics [3,4]. Finally, online search interest in health insurance exchanges may not accurately reflect eventual enrollment outcomes. However, to our knowledge, no predictive model of enrollment through health insurance exchanges has been developed, and we propose our study as an initial step forward in forecasting insurance enrollment in this new healthcare environment.

In comparing online search interest associated with the roll out of four major government programs, we identified a lack of sustained interest in health insurance exchanges in the implementation period, but a spike in interest at the end of the open enrollment as online outreach was intensified. This pattern was different from Medicare Part D, which had longer sustained interest and a smaller relative spike at the end of the open enrollment period in 2006. Future outreach strategies for the health insurance exchanges should include an online emphasis such as using digital campaigns and applying principles of online commerce. As enrollment for health insurance exchanges continues, our results point to the need for more expansive outreach strategies to ensure that coverage goals are achieved to ensure broader access to health care across the United States.

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