Data-Tracking on Government, Non-profit, and Commercial Health-Related Websites

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INTRODUCTION

Health information privacy is a core value of American health. The privacy of communication between healthcare providers and patients is protected by law, but no equivalent protection exists for individuals performing health-related searches on patient-facing websites. Consumer aggregated data obtained from searches on patient-facing websites can be used to create a health profile and even merge it with non-health-related information. These data profiles can be sold to other companies or used to curate targeted advertisement that follows the individual user. While this information collection is acknowledged, the degree of such data releases and specificity to the individual is often unknown to individual users.¹ Therefore, we used a privacy inspection tool² to determine prevalence and type of data tracking from commonly searched government and non-government health-related websites.

METHODS

Our sample was restricted to US-based websites from the most trafficked health websites measured by the website traffic monitoring service SimilarWeb (www.similarweb.com) and all sites from the Medical Library Association’s recommended websites for health information as of October 17, 2020.

To identify website monitoring and data collection, each website URL was examined with *Blacklight*, an internet-based tool which tests how website use surveillance on their users.³ We present data for each website including use of ad tracking, use of third-party tracking and identification “cookies,” and availability of use data for Facebook and Google Analytics tracking.

Data was described using frequencies and measures of central tendencies. The ANOVA test and chi-square test were used to assess differences in means and frequencies between government, non-profit, and commercial health websites. All analyses were conducted in R version 4.0.2 (R Foundation).

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RESULTS

The average number of ad trackers across included websites was 2.11 (SD 0.60), 7.15 (SD 6.26), and 15.84 (SD 10.29) for government, non-profit, and commercial health websites, respectively ($p < 0.001$). The average number of third-party cookies across included websites was 1.11 (SD 1.05), 10.85 (SD 11.9), and 25.08 (SD 25.45) for government, non-profit, and commercial health websites, respectively ($p=0.003$). Regarding websites informing Facebook of user activity, 0 (0.0%) government website, 10 (50.0%) non-profit websites, and 15 (60.0%) of commercial websites provided user data to Facebook. Regarding websites informing Google analytics of user activity, 6 (67.7%) government websites, 14 (70.0%) non-profit websites, and 16 (64.0%) of commercial websites provided user data to Google analytics. Average search results are recorded in Table 1, while individual results can be found in Table 2.

DISCUSSION

All health websites studied provide data to ad trackers and third-party cookies. Popular commercial websites used substantially more third-party cookies and ad-trackers than non-profit websites, which had more than the average government website.

Health-related websites often serve as a supplement, in which patients can find answers and further explanations for disease and treatment options. Data provided this way can be used to construct a personal profile of personal health information, and subsequently be provided or sold to other

Table 1 Mean and count frequency of data provided to outside organizations by Government, Non-profit, and Commercial website

	Ad trackers	Third-party cookies	Information provided to Facebook	Information provided to Google Analytics
Reference	7	3	*	*
Government websites N=9	2.11 (0.60)	1.11 (1.05)	0 (0.0%)	6 (67.7%)
Non-profit N=20	7.15 (6.26)	10.85 (11.99)	10 (50.0%)	14 (70.0%)
Commercial websites N=25	15.84 (10.29)	25.08 (25.45)	15 (60.0%)	16 (64.0%)

Percentages based upon row totals
Data abstracted on October 17, 2020

Table 2 Compiled List of Reviewed Websites

	Ad trackers	Third-party cookies	Information provided to Facebook	Information provided to Google Analytics
Reference	7	3	*	*
Government websites				
Cdc.gov	3	2		
Medlineplus.gov	3	0		Yes
NIH.gov	2	2		Yes
NIA.NIH.gov	2	0		Yes
Health.gov	2	2		Yes
Cancer.gov	1	2		
NIDDK.nih.gov	2	0		
Healthfinder.gov	2	2		Yes
nei.nih.gov	2	0		Yes
Commercial websites				
Healthline.com	8	16		Yes
Webmd.com	28	33	Yes	
Medicalnewstoday.com	13	18		Yes
Cvs.com	3	3		
Walgreens.com	30	54	Yes	
Athenahealth.com	20	27	Yes	
Myfitnesspal.com	2	0		Yes
Fitbit.com	16	16	Yes	Yes
Drugs.com	9	16		Yes
Psychologytoday.com	6	4		Yes
Menshealth.com	17	15	Yes	Yes
Womenshealthmag.com	17	17	Yes	Yes
Msmanuals.com	6	3	Yes	Yes
Medicinenet.com	15	20	Yes	
Medscape.com	20	16	Yes	
Healthgrades.com	10	4	Yes	Yes
Babycenter.com	38	92		Yes
Practicefusion.com	8	8	Yes	Yes
Weightwatchers.com	25	51	Yes	Yes
Yahoo.com/lifestyle/tagged/health	38	86		
Everydayhealth.com	28	47	Yes	Yes
Healthgrades.com	10	4	Yes	Yes
Mercola.com	5	4		
Health.com	12	53		Yes
Rxlist.com	12	20	Yes	
Non-profit				
Mayoclinic.org	15	31		Yes
Clevelandclinic.org	4	3		Yes
Kidshealth.org	6	11	Yes	Yes
Hivinsite.ucsf.edu	0	1		
Familydoctor.org	9	6	Yes	Yes
Cancer.org	21	40	Yes	Yes
Breastcancer.org	10	4	Yes	Yes
Cancercare.org	3	4		Yes
Foundationforwomenscancer.org	3	6	Yes	
Oncolink.org	7	17		Yes
Diabetes.org	13	19	Yes	Yes
Joslin.org	2	0		Yes
Childrenwithdiabetes.com	0	0		
Afb.org	5	6	Yes	
w-e-h.org	0	0		
Heart.org	16	34	Yes	Yes
Thebody.com	16	10	Yes	Yes
Americanstroke.org	1	4		
Health.harvard.edu	3	3		Yes
Stroke.org	9	18	Yes	Yes

Data abstracted on October 17, 2020, using Blacklight a publicly available service, with code made available on GitHub, which traverses individual websites and collects information such as third-party cookies, ad trackers, key logging, session recording, canvas fingerprinting, Facebook tracking, and Google Analytics use

companies for the purposes of improving advertising targeting, as is the case in the current report in which this relationship with Google and Facebook is observed. The degree to which this information is used this way is unknown.⁴ However, this appears to be a common practice, and a recent publication of COVID-19-related websites found similar results related to the prevalence of third-party tracking.⁵ Greater

clarity of how websites use collected health data may allow better identification of online resources that maximize the privacy of users, while also provided helpful medical information.

This study has several limitations. First, we used one software program to examine website tracking, and the algorithm for monitoring data-privacy may vary.⁶ Furthermore, we

limited our search to selected commonly trafficked websites. A broader sample may provide more granularity among health-related websites. Finally, it is not entirely known what the websites do with this information, or its overall benefits or harms.

We found that every category of health-related website examined provided information to ad trackers and created third-party cookies. Furthermore, providing data to Facebook and Google for targeted advertising was found to be relatively common, particularly among our sample of commercial and non-profit health-related websites. Searching for personal health information is not a private action and patients and providers must account for this when they search for health information online.

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Declarations:

Conflict of Interest: The authors declare no competing interests.

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