



## Vaccine-criticism on the internet: New insights based on French-speaking websites



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### ABSTRACT

The internet is playing an increasingly important part in fueling vaccine related controversies and in generating vaccine hesitant behaviors. English language Antivaccination websites have been thoroughly analyzed, however, little is known of the arguments presented in other languages on the internet. This study presents three types of results: (1) Authors apply a time tested content analysis methodology to describe the information diffused by French language vaccine critical websites in comparison with English speaking websites. The contents of French language vaccine critical websites are very similar to those of English language websites except for the relative absence of moral and religious arguments. (2) Authors evaluate the likelihood that internet users will find those websites through vaccine-related queries on a variety of French-language versions of google. Queries on controversial vaccines generated many more vaccine critical websites than queries on vaccination in general. (3) Authors propose a typology of vaccine critical websites. Authors distinguish between (a) websites that criticize all vaccines (“antivaccine” websites) and websites that criticize only some vaccines (“vaccine-selective” websites), and between (b) websites that focus on vaccines (“vaccine-focused” websites) and those for which vaccines were only a secondary topic of interest (“generalist” websites). The differences in stances by groups and websites affect the likelihood that they will be believed and by whom. This study therefore helps understand the different information landscapes that may contribute to the variety of forms of vaccine hesitancy. Public authorities should have better awareness and understanding of these stances to bring appropriate answers to the different controversies about vaccination.

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### 1. Context

Vaccination is widely regarded as one of the greatest achievements of biomedicine [1]. However, vaccines have been the object of controversies and opposition since the beginning of their use [2]. The past twenty years have seen a resurgence of vaccine related controversies which translated into declining immunization rates [3–8]. Since 2007, the HPV vaccine has fueled a heated debate in many different countries including France [9,10]. In France and Belgium, the use of aluminium as an adjuvant and

its supposed link to a new disease called Macrophagus Myofasciite has been the focus of media coverage since the end of 2010 [11–14]. More and more people seem to be distrustful of vaccines in general but more often of some vaccines in particular [4,6]. This has prompted analysts to shift the focus from radical opposition to all vaccines, i.e. anti-vaccinationism, to various degrees of hesitation regarding different vaccines, i.e. vaccine hesitancy [5,15,16].

The internet is playing an increasingly important part in fueling these controversies and arguably the growth of vaccine hesitancy. For instance, the internet has played an important role in France in the emergence of a controversy over the safety of the new vaccines employed during the 2009 A(H1N1)v pandemic vaccination campaign [17]. Also, a recent study in Germany showed that consulting vaccine-critical websites reduces vaccination intentions [18].

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The internet is becoming one of the primary sources of information for people's health decisions in the US but also in most European countries such as France even though to a lesser degree [19,20]. This poses new challenges for vaccine-related communication [21]. One of the defining features of the internet is the ease with which people can post information on any subject with very little regulation of the content. Consequently, it has become very easy to voice negative information about vaccines on a widely accessible platform. However, the overwhelming quantity of information published on internet means that there is a heightened competition for web users' attention and that most websites are very rarely consulted [22].

Several web-content analyses have greatly advanced the understanding of websites critical of vaccines and the rhetorical strategies they deploy to convince information-seekers [23–28]. However, to the best of our knowledge, this exploration has been largely limited to the English language content of the internet. This entails limitations in our understanding of non-English speaking movements critical of vaccines. As several authors have shown, trans-national and cross-cultural comparisons are necessary to understand the challenges that current vaccination campaigns are facing [8,15].

## 2. Aims of the study

Our first aim was to assess the availability of French-language websites critical of vaccines and vaccination for internet users in developed countries using typical search engines (such as Google) and querying about all vaccines or specific controversial vaccines.

Our second aim was to analyze the contents of these vaccine-critical websites. Our research questions are: (1) Do they share the same arguments as English-speaking websites? And, (2) Do they use the same rhetorical strategies?

Our third aim was to build a typology of websites critical of vaccines and vaccination. Three areas will particularly inform the typology: (1) The key arguments against vaccines; (2) Which vaccine(s) are being criticized?; and, (3) What are the sources of information grounding the arguments?

## 3. Methods

Web searches were conducted on May 7, 2014 using the queries "vaccin", "vaccination", "vaccin aluminium" and "vaccin papillomavirus" on Google.fr, Google.be, Google.ch and Google.ca. The two first terms were chosen for their likelihood of being used by an internet user in a search query. "Immunisation" is very seldom used in French-speaking countries compared to vaccination. We extended our research to two ongoing vaccine-related controversies in French-speaking countries [29]. "Vaccin aluminium" and "vaccin papillomavirus" were chosen over other HPV vaccination and aluminium vaccination queries using Google trends to estimate their popularity. Google.fr (France), Google.be (Belgium), Google.ch (Switzerland) and Google.ca (Canada) were chosen because these countries present the largest communities of native French-speakers in developed countries. Google was chosen as it is the most widely used search engine in these four countries<sup>1</sup>. Health information seekers do not read further than the first page of Google results 97.2% of the time [30], but in order to have a sufficient number of websites for a meaningful analysis, the first 30 results for each of these queries were examined. To control for personalization of search results [31], queries were performed

simultaneously on two computers in two different locations (Marseille and Paris) using newly created sessions and newly installed browsers. Location did not affect the sample of websites fitting inclusion criteria and affected marginally the ranking of these websites ( $\pm 2$  ranks). Results are presented using data from Paris only. Websites were classified as vaccine-critical and included for content analysis if they opposed or criticized any vaccination recommendation. This inclusion criterion differs somewhat from previous research, which focused on childhood immunization, to be consistent with our aim to study information likely to generate hesitancy or non-compliance with select vaccines, but not necessarily with all vaccines<sup>2</sup>. Exclusion criteria were the following: (1) chat-rooms and forums; (2) news media, medical and academic journals, library websites and encyclopedias; (3) video results; (4) book pre-views; (5) inactive links; (6) non-French language; (7) information applicable primarily to animals.

These criteria and the content analysis coding scheme are adapted from previous studies of antivaccination websites [23–28]. In addition to this traditional coding scheme, we noted which vaccines were criticized on each website and which diseases were attributed to these vaccines. We also coded whether the website criticized vaccines in general and whether they defended some specific vaccines or defended vaccination in general. Coding was performed full-time by the first author between May 12 and 26 2014. When possible, the entire part of the website dealing with vaccination was coded. However, some websites contained an enormous amount of information. In these cases, coding was limited to the 100 first or most pertinent articles. In addition to the coding of vaccine-critical websites, we counted the number and page-rank of newsmedia articles for each of these queries even though they were excluded from systematic coding. This was meant to put vaccine-critical websites in perspective and to evaluate the potential availability of vaccine-critical information via the media on internet.

## 4. Results and discussion

Research yielded 17 websites matching the inclusion criteria (Table 1).

### 4.1. Google page-rank: The availability of vaccine-critical information

For each search engine, queries using "vaccin" and queries using "vaccination" yielded the same vaccine-critical websites but with a different page-rank ( $\pm 12$  ranks). These 8 queries yielded 4 websites, with no websites generated by queries on Google.ca and two websites for Google.be. In half of these queries (4 out of 8), one of the websites appeared on the first result-page, while they appeared three times on the second result-page and only once on the third. This means that, except for Google.ca, vaccine critical websites are easily available when typing general information queries on Google.

Only three different websites were generated using the search term "vaccin papillomavirus". However one of these websites appeared in all the different search engines, and another in three out of four queries. These two websites were specific to the HPV vaccine since they only appeared when using this query. They also appeared quite far in the page ranking, with only one appearance on the second page and seven appearances on the third page.

The query using "vaccin aluminium" generated the greatest number of websites. Each query yielded from 6 to 12 websites

<sup>1</sup> In 2013, Google represented 93.99% of queries in France, 97.56% of queries in Belgium, 94.5% of queries in Switzerland and 90.1% in Canada. Source: <http://gs.statcounter.com>.

<sup>2</sup> Previous studies focused on childhood immunization and included "focus on adult vaccination" in the list of exclusion criteria.

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