Six years of activity of the Italian vaccine portal "VaccinarSì": a web traffic evaluation using Google Analytics

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Abstract

Background. *Despite the scientific consensus about vaccines safety and effectiveness, there is still a discrepancy between scientific evidence and perception by the general population. The "VaccinarSì" portal was created in 2013 by Italian specialists in Public Health to provide evidence-based information regarding vaccination.*

Study Design. *The purpose of this study was to analyse the web traffic on "VaccinarSì" platform during a six-year period (May 8, 2013-May 8, 2019). Moreover, we compared the first six-month with the last six-month period of the website activity, to identify potential areas of improvements.*

Methods. *This is a descriptive study using Google Analytics data. We collected data regarding the following: total number of sessions to the portal, total number of pages viewed, total number of users and the number of new visitors, geographical locations and demography of users as well as user access mode (type of device used and way of access). We also collected some data that were informative about the possibility to infer the level of visitors' engagement with the portal, such as thee number of returning users, bounce rate, number of pages visited per session and mean session duration.*

Results. *Throughout the relevant period, the portal has consistently increased its popularity, with a remarkable increment of monthly connections (ending up to more than 80,000/month) from all over Italy. Visitors were mainly female (71.1%), aged between 25 and 44 years (64.7%). Healthcare professionals were responsible for a considerable proportion of accesses (50.6%). The mobile has become the dominant device used to access the portal, accounting for 77.8% of total connection in the last six months. Similarly, in the last period, organic search accounted for 92% of all connections. Measles and MPR vaccine, as well as chickenpox and hexavalent vaccine, have remained the most appealing topics of interest among visitors over the years. The page that attracted more visitors over the six years was "real risks and benefits of vaccination", accounting for 5.67% of total sessions with a high mean duration spent of 05:08 minutes.*

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Conclusions. *During the six years of activity, overall, the level of users' engagement with the portal has dropped with an increased bounce rate and a lower average number of pages visited per session and a lower mean duration of each connection. The lowest engagement involved connections accessed through mobile devices. Results helped "Vaccinarsi" developers to speculate about future strategies to further increase the platform popularity and optimize visitors' engagement.*

Introduction

Vaccination has been one of the most effective public health interventions in reducing mortality (1). Despite the scientific consensus about vaccines safety and effectiveness, there is still a discrepancy between scientific evidence and general population perception (2, 3).

Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite the availability of vaccination services and represents a serious public health concern, since suboptimal vaccination coverages may jeopardize attaining herd immunity and lead to disease outbreaks (4). While existing since the practice first began (5), vaccine hesitancy has increasingly spread out with the Internet development (6).

The worldwide interconnection has enormously expanded since its creation (7) and has deeply reshaped the way people look for information (8), with a growing number of people using the Internet also to research health data (9), including information about vaccines (10, 11) A recent Italian survey reported that 60% of Italian parents would look up on the web for vaccine information, though just one third would consider it a sufficiently reliable source of information (12). Further, healthcare professionals themselves have been using it broadly (13, 14).

Mass-mediated health messages seem to influence individuals' perceptions, attitudes, intentions and behavior (15) and the impact of the Internet on vaccination decision-making has been documented (16). The information available on the web is potentially more up-to-date than that found in printed books, but it might not be unconditionally reliable, as lots of important information are missing (17) and conspicuous misinformation has spread out widely, especially regarding vaccination issues, thereby discrediting the medical community and generating distress and fear (18). There are many web sources, ranging from the government-sponsored websites, pro-vaccine evidence-based resources, to social media and anti-vaccination websites that use anecdotes and narratives to disseminate misinformation (19). Recently, vaccine detractors have been taking advantage of the web through well-organized groups and rapidly growing international forums for communicating and networking (20) to spread anti-vaccine information. This had a detrimental effect on health policies (18, 21). The data show that vaccine-hesitant parents, who make up about 15% of Italian parents (12), have been more present and active on the web than pro-vaccines parents (22). Moreover, it has been proved that web users are more likely to ignore scientific information and focus on narratives (23) and tend to select the information that matches with their beliefs, and to disregard dissenting information. This has facilitated the creation of the 'echo chamber' effect (i.e., polarized groups of like-minded people who keep framing and reinforcing a shared narrative) (24).

The "VaccinarSì" project was created on May 8, 2013 by Italian specialists in Public Health under the supervision of the Italian Society of Hygiene (Società Italiana di Igiene – SItI) in order to tackle misinformation and offer people reliable scientific information

about vaccines and vaccination (25). It was designed to provide parents and general population with scientific resources such as articles, paper-based tools, videos and newsletters that would shed light on vaccines-related issues and provide evidence-based answers to several common doubts and questions. Twitter and Facebook accounts have also been created to spread awareness about the platform as well as a YouTube channel and a Blog. An initial analysis of the web traffic on the portal was carried out after four months following launch, using Google Analytics data. The analysis showed encouraging results with an impact all over Italy and abroad, with many pages having been visited and good visibility on the google browser (26). Google Analytics was used for the process evaluation of Internet-delivered interventions by receiving information on user traffic and subsequently informing website improvement. The same methodology has been applied also in other health research (27, 28).

The purpose of this study was to evaluate "VaccinarSì" portal six years after its creation using Google Analytics data. Then, we compared the first six-month to the last six-month period of the website activity in order to work out if relevant changes occurred over the years. Our ultimate purpose was to understand how users engage with the platform to appreciate its usefulness as a public health tool and to inform strategies for future interventions.

Methods

1. Design, setting and study population

This is a descriptive study investigating the web traffic over the six years of "VaccinarSì" portal (May 8, 2013-May 8, 2019) using Google Analytics data. Within the study period we identified the first six-month period (between May 8, 2013 and

Nov 8, 2013) and the last six-month period (between Nov 8, 2018 and May 8, 2019). The study population included all the users of the website. VaccinarSì was created on May 8, 2013 by the Italian Society of Hygiene and preventive Medicine (SItI) and continued its development by creating specific regional websites. It is a freely accessible web portal (https://www.vaccinarsi.org/) (25) with more than 400 pages in Italian language. The portal is organized in five main sections: 'Vaccine-preventable diseases'; 'Available vaccines'; 'Benefits and risks of vaccination'; 'Travel immunization'; and a section 'Against misinformation', which approaches arguments and theories of anti-vaccination movements from a scientific perspective. In addition, there are a 'News section', dealing with recent scientific evidences, guidelines, outbreaks, and epidemics; and an 'Events section', which lists relevant conferences and congresses regarding immunization against infectious diseases. Every piece of content is presented with title and abstract to offer a clear overview of the topic and, then, an essay discusses the topic more in detail. Furthermore, references and links to external sources are provided. All contents are posted together with selected pictures, tables, and illustrations. A number of different communication formats are applied, including: training videos, multimedia presentations, tutorials, cartoons and stories. Before being published on the portal, all content is reviewed by the scientific and steering committees. There are no separate contents for health care professionals or general population (26).

2. Data collection and Statistical analysis

The Google Analytics allows the collection of various types of data about users' behavior in using the website. Relevant information is summarized in a real-time, interactive dashboard format, which can be accessed by logging in. The Google Analytics data are presented as aggregated and do not contain

any personally identifiable information, making it an accessible tool without ethical concerns (29).

We collected data regarding the following factors: total number of sessions to the portal, total number of pages viewed, total number of users and the number of new visitors (i.e. visiting the website for the first time).

The Google Analytics also provided data regarding geographical locations and demographics of users as well as user access mode (type of device used and way of access) and IP addresses (i.e. the number assigned to a network equipped piece of hardware by which other devices identify it).

Demographic data (age and gender) of users were extrapolated through heuristic estimation based on repeated anonymous statistical sampling from November 6, 2015. Since age and gender are among other per-set personal information of each Google account, Google can identify users who are logged in while they are visiting a website, and Google Analytics can match the users' personal information with their website sessions.

The devices considered in the study were desktops, tablets, and mobile phones (mentioned here as mobile devices). The channels used to access the platform were: direct link (i.e., typing the web URL directly into a browser), organic search (i.e. entry through a search engine) and referrals via another website, via social media, and via email. Some data such as locations of users and channels to access the portal provided information about the spreading of the portal.

We also collected some data that are informative on the level of visitors' engagement with the portal such as: number of returning users (i.e. visiting with the same IP address), bounce rate, number of pages visited per session and mean sessions' duration. The 'bounce rate' is defined as the percentage of visitors that leave the website after viewing only one page without interacting further with the page. The number of pages per session refers to the mean number of webpages within the platform that users viewed in a single session and the mean session duration (minutes, seconds) refers to the mean duration of time users spent on the platform.

Categorical variables were expressed as frequencies and quantitative variables as mean. A univariate descriptive analysis of the connections was performed considering the variables of interest. After considering the overall six years of activity, we compared data obtained from the first six-month period to those of the last six-month period. Frequencies were compared by Chi-squared test. Mean could not be compared since we lack standard deviation and standard error.

Results

1. Sessions, trend and users

Main characteristics of connections accessed to VaccinarSì portal during the six years of its activity and during the first six-month and last six-month periods are reported in Table 1. The average monthly connections have significantly increased over the years. Globally, there were 3,363,329 users and out of them 87.9% were new users, decreasing from 88.7% in 2013 to 85.9% in 2019. While regular trends of connections during the study period could not be identified, generally, mean sessions per day were higher during week days and lower during weekend days or holiday days. Users' demographics were not available for the first period since heuristic sampling began in November 2015. In the last six-month period, users estimates were 71.1% female and 64.8% aged 25-44 years. These percentages are very similar to those of the entire six-year period (71.4% female and 63.4% aged between 25-44 years).

Among sessions referred from other websites, an overall 50.6% of the referred

Table 1 - Characteristics of connections to "VaccinarSì" portal during the first and the last six months and the six years of activity.

Connections characteristics	First six months *May 8, 2013 -* *Nov 8, 2013*	Last six months *Nov 8, 2018 -* *May 8, 2019*	Six years *May 8, 2013-* *May 8, 2019*
Total sessions	98,171	493,470	4,204,852
Sessions/Month (mean)	16,361	82,245	58,400
Sessions from Italy	93,481	476,215	4,034,934
Pages viewed	231,391	644,895	6,984,077
Pages/Session (mean)	2.36	1.31	1.66
Duration/Session (min)	02:09	00:54	01:17
Returning users (%)	11.4	14.1	12.1
Bounce rate (%)	67.76	86.23	79.27

connections (90,067/ 178,039) came from websites of Local Health Authorities [*Aziende sanitarie locali - ASL*; *Aziende provinciali socio-sanitarie – APS; Unità locali socio-sanitarie - ULSS*], with an increase from 44.4% (4,744/ 10,696) of the first period to 54.0% (2,916/ 5,399) of the last period.

Most connections came from Italy with a slight increase over the years from 95.2% of total sessions in 2013 to 96.5% in 2019 with an average of 96% during the six years. Overall, the Italian locations where users connected from, almost doubled during the six years, increasing from 662 in 2013 to 1151 locations in 2019. The most popular cities in terms of connections were Milan and Rome accounting respectively for 17.9% and 18.3% of total sessions. Other connections came from almost all over the world and the most frequent countries were Switzerland, U.S., U.K., Germany, France Spain and Belgium.

2. Access mode (device and channel) and pages viewed

Other connections features such as the device and the channel used to access the portal are reported in Table 2. The most relevant difference concerns the devices used to access the website with the Mobile becoming the dominant device used at the expense of the use of Personal Computer that notably decreased. The main way to access the portal has been the 'organic search' (which means using a search engine), which increased significantly over the years. Google was the search engine predominantly used for organic search, accounting for 67.42% (66,182) in the first six-month period and 91.33% (450,698) of total organic searches in the last six-month period.

Overall, the most frequent search terms used in organic search were: "rotavirus", "hexavalent vaccine", "vaccinarsi", "pneumococcus" and "meningoccocco"; in the first period were "hexavalent vaccine", "vaccinarsi", "hexavalent", "chickenpox vaccine" and "MPR vaccine"; in the last period were "hexavalent vaccine", "hexavalent", "vaccinarsi", "chickenpox vaccine" and "pneumococcus".

In August 2019, the portal resulted to be the first in Google search for the keyword "vaccinarsi", the 5th for "vaccinations" [*vaccinazioni*], 10th for "mumps" [*parotite*] and "meningococcus" [*meningoccocco*], 13th for "pertussis" [*pertosse*], 14th for "chickenpox" [*varicella*], 25th for "vaccines" [*vaccini*] and 27th for "measles" [*morbillo*].

Of all sessions accessed through social media for six years, 90.5% were from

Table 2 - Characteristics of connections to "VaccinarSì" portal regarding devices and channels used to access. Comparison between the first and the last six months and the six years. Chi squared test. *p<0.001

Connections characteristics	First six months *May 8, 2013 – Nov 8, 2013* (N. 98,171)		Last six months *Nov 8, 2018 – May 8, 2019* (N. 493,470)		Six years *May 8, 2013 – May 8, 2019* (N. 4,204,851)	
	N.	(%)	N.	(%)	N.	(%)
Device						
Desktop	60,601	(61.7)	93,347	(18.9)*	1,426,806	(34.0)
Mobile	26,707	(27.2)	383,955	(77.8)*	2,464,457	(58.6)
Tablet	10,863	(11.1)	16,168	(3.3)*	313,588	(7.5)
Channel of access						
Organic search	67,474	(68.7)	454,066	(92.0)*	3,270,380	(77.8)
Direct	14,982	(15.3)	31,980	(6.5)*	625,067	(14.9)
Referral	10,696	(10.9)	5,399	(1.1)*	178,039	(4.2)
Social	4,425	(4.5)	2,025	(0.4)*	128,928	(3.1)
Email	594	(0.6)	-	-	2,227	(0.05)
Paid search	-	-	-	-	211	(0.01)

Facebook, 6.4% from Blogger and 1.7% from Twitter. As for other social networks, the most frequent were Disqus, Wordpress, Google+, Tumblr, Douban and LinkedIn.

The page that attracted more visitors for the six years period was "benefits and risks of vaccination", which accounted for 5.67% of total sessions and with a high mean duration spent of 05:08 minutes. Other most visited pages were those regarding: "disease caused by meningococcus" (5.0%), "rotavirus gastroenteritis" (4.4%), "hexavalent vaccine" (3.9%) and "measles-mumps-rubella (MPR) vaccine" (3.3%).

In the first period analysed the most frequent pages accessed were: "hexavalent vaccine" (accounting for 15.3% of total connections), "MPR-vaccine" (10.2%), "HPV vaccine" (5.2%), "chickenpox vaccine" (4.1%) and "vaccines do not cause autism" (3.2%).

In the last period the most frequent pages accessed were "MPR-vaccine" (accounting for 10.2% of total sessions), "hexavalent vaccine" (9.8%), "benefits and risks of vaccination- real risks of vaccination" (9.6%), "meningococcal conjugate vaccine" (7.3%) and "chickenpox vaccine" (5.9%). All these pages were visited for an average duration of approximately four minutes, and the page about real risks of vaccination was visited for more than 6 minutes.

3. Engagement

Engagement parameters according to users' profile, device, access way to the portal and social media during the six years are reported in Table 3. Returning visitors engaged with the portal to a greater extent compared to new visitors, as well as for users accessing by personal computer (desktop) compared to those connections accessing through mobile. Users accessing through email and referral showed better engagement parameters. By contrast, those that accessed by organic search and social media reported a worse engagement. Connections accessed from blogs had a high average of pages visited per session.

Over the years, the visitor's engagement experienced a remarkable worsening for all categories (Table 4). Both in the first and in the last period, users that accessed through the key-word "vaccinarsi" showed strong level of engagement with respectively 4.82 and 4.47 pages visited per connection, a mean duration of each session of 05:10 and 03:12 minutes and a very low bounce

Table 3 - Engagement indicators according to user's profile, device, access way and most used social media during the six years of "VaccinarSì" portal activity.

Engagement indicators - Six years period *May 8, 2013-May 8, 2019*	Pages/Session (mean)	Duration/Session (min)	Bounce rate (%)
Visitor			
New visitors	1.58	01:07	80.70
Returning visitors	1.98	01:59	73.51
Device			
Desktop	2.12	01:52	70.76
Mobile	1.36	00:54	84.94
Tablet	1.92	01:44	73.49
Access			
Organic search	1.57	01:13	81.29
Direct	1.78	01:26	76.85
Referral	2.97	02:14	50.90
Social	1.65	01:07	80.04
Email	3.54	04:03	31.07
Social media			
Facebook	1.51	00:57	82.09
Blogger	3.38	03:16	53.82
Twitter	1.69	01:10	80.87
YouTube	1.13	00:19	92.91

Table 4 - Engagement indicators according to user profile, device used, the access way and the most used social media. Comparison between connections to the "VaccinaSì" between first and last six months.

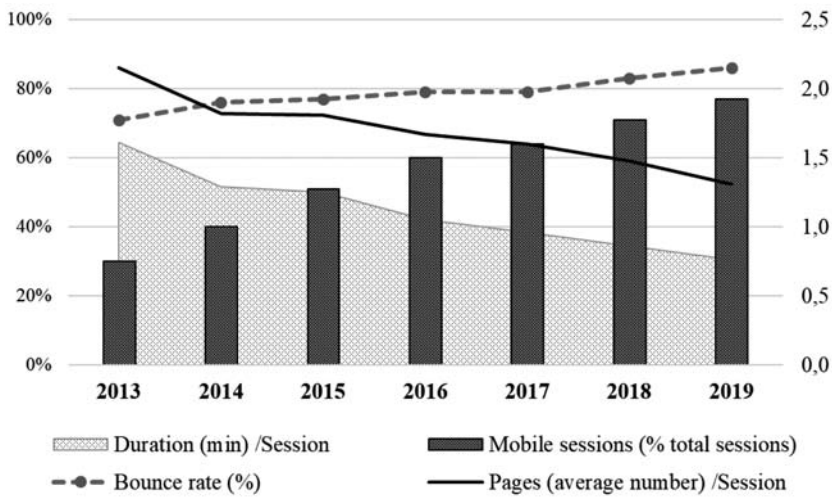| Engagemen indicators	Pages/ Session (mean)		Duration/ Session (min)		Bounce rate (%)	
	May 8, 2013-Nov 8, 2013	*Nov 8, 2018-May 8, 2019*	*May 8, 2013-Nov 8, 2013*	*Nov 8, 2018-May 8, 2019*	*May 8, 2013-Nov 8, 2013*	*Nov 8, 2018-May 8, 2019*
Visitor						
New visitors	2.15	1.27	01:49	00:48	70.94	86.99
Returning visitors	3.14	1.44	03:28	01:18	55.67	83.11
Device						
Desktop	2.76	1.64	02:33	01:26	62.28	78.79
Mobile	1.51	1.22	01:15	00:45	80.34	88.24
Tablet	2.17	1.48	02:12	01:11	67.43	82.11
Access						
Organic search	2.03	1.26	01:47	00:52	73.65	87.17
Direct	2.77	1.66	02:50	01:10	62.27	78.05
Referral	3.66	2.69	03:18	01:40	44.33	57.21
Social	2.71	1.49	02:27	00:49	56.75	82.81
Email	3.22	-	04:04	-	42.26	-
Social media						
Facebook	2.12	1.44	01:46	00:44	61,98	84.02
Blogger	4.88	3.32	02:03	00:48	68,75	82.26
Twitter	2.00	1.32	04:52	03:25	35,27	41.67
YouTube	-	1.29	-	00:32	-	90.41
Instagram	-	1.75	-	00:39	-	50.00

Figure 1 - Trends in proportion of sessions accessed by mobile, bounce rate (%), average pages visited per session and mean duration of each session (seconds). "VaccinarSì" portal over six years.

rate (30.44% and 24.75%). Engagement parameters and the proportion of total session accessed by mobile phone for each year of the study period are represented in Figure 1.

Discussion

The "VaccinarSì" portal over the six years of its activity has continuously increased its popularity, with a remarkable increment of monthly visitors from all over Italy. Nonetheless, a regular trend in visits cannot be detected: the pattern of visits is unpredictable and might be related to news facts or other events. For instance, in 2017 there was a significant increase in visits, which was probably linked to the occurrence of a large measles outbreak in Italy in January 2017. This disease outbreak triggered the adoption of the Decree Law N. 73/2017, which extended the number of mandatory vaccines for those aged 0–16 years (30). The progressive increase in the number of users and the doubling of localities of access demonstrate that the portal has reached a satisfying visibility at national level. Furthermore, connections from foreigner countries could suggest developing an English version of the website to eventually increase its popularity even abroad, albeit in minor proportion. The low percentage of direct accesses through URL address might imply that the platform might not be extensively well-known yet. Some advertising campaigns or other marketing strategies could improve its popularity. Since Google seems to be the most used search engine even for scientific topics as vaccines, it is important for the portal to be clearly displayed by Google searches.

The "VaccinarSì" portal was visited mainly by women aged between 25 and 44 years old, and these demographics seem not to have changed over the years thus confirming the expectation that young mothers may represent the majority of target population of the platform. Moreover, according to the proportion of connections referred from Local Health Authorities, the portal seemed to be accessed consistently by healthcare professionals, which is coherent with the regular weekly pattern observed.

As regards the most engaging issues, measles and MPR-vaccine as well as

chickenpox and hexavalent-vaccine have continued to be the most appealing topics of interest among visitors over the years. Other subjects of interest have likely to be related to those vaccines proposed by the current Italian vaccination schedule. The page regarding real risks and benefits of vaccination being the most visited and engaging all over the years is quite reassuring that the platform is serving its main purpose of fighting disinformation. Indeed, as we can assume that this webpage is not visited by healthcare professionals, we can reasonably deduce that it is mainly visited by general population, showing a great concern about vaccines safety. This result is coherent with the context of debate and hesitancy and reinforces the assumption that most people use the Internet to search scientific issues, and that the platform may serve to spread scientific information to general population. Each year a greater proportion of users accessed the website from a mobile phone reflecting the dissemination of the smartphones over the last years in Italy (31, 32). The reduction in connections accessed through social channels might suggest that the related accounts have not engaged a successful marketing strategy in social applications.

Traffic information provides an approximation of the level of interaction the users had with the platform and a high percentage of returning users, low bounce rate, high number of pages viewed per session and high mean session duration collectively enable to infer an overall strong level of engagement (28). During the six years of activity, data show that there has been an overall decrease in the level of users' engagement with substantial reduction in mean pages visited each session and average time spent per connection and an increased bounce rate. We guess that this change might be attributed to the increased use of mobile phones because those sessions accessed by personal computers lasted on average

sensibly longer whereas conversely those connections accessed through mobile devices lasted less than the mean connection span. A potential explanation could be that the portal might be hardly accessible by mobile devices due to graphic features of mobile interface or because text articles could have revealed barely readable by small screens. Another explanation could be that separate contents for healthcare professionals and general population may be required.

Generally, a low bounce rate is regarded as indicative of a high overall engagement, especially for a multicomponent platform where users often need to visit various webpages in order to obtain the information they are seeking (27). However, a high bounce rate does not necessarily imply minimal interaction but might also suggest that users get access to "VaccinarSì" to search for specific (and easy to find) information rather than general ones and then leave the website as soon as they find it. Indeed, most users accessed the portal through organic search and probably have been referred directly to the page containing the information sought. The short mean duration and few pages visited per connection could be due to such reason too. The increase in returning visitors over the years suggests an improved engagement with the website even though they have witnessed a relevant transformation in their engagement too. Altogether, a satisfying level of engagement was seen among returning visitors, among those accessing by a desktop and through organic search with the specific keyword 'vaccinarsi' or those referred by email newsletter. Among social channels, bloggers were those that referred more concerned visitors. Facebook has become the most popular application, but other new social media have appeared such as YouTube and Instagram. Generally, an overall modification in parameters that might indicate a lower level of engagement has occurred for all users over the years.

The portal might have been affected by some limitations. For instance, the contents might have been arduously accessible by general population as the language and terms used are quite technical and hardly understandable for non-healthcare workers. Probably the platform could make a greater impact on visitors by using a plainer vocabulary or implementing briefer and more highlighted contents. It could also be considered adding a Frequent Asked Question (FAQ) section to respond to the most frequent inquiries of the anti-vaccine and counteract the most common 'fake news'.

Nevertheless, the changing of those indicators may also be due to a revolution of society driven by the extensive dissemination of smartphones that might have led to a fast-paced seeking behavior. Indeed, it has been proved that people looking for eHealth usually look for short communications and read rapidly (33) so that the most efficient way of communicating on the web seems to be through short articles, interactive resources, videos and pictures (34, 35). To counteract the viral dissemination of misinformation (36) and further improve vaccination acceptance, medical community and public health institutions should consider possible strategies that integrate new and old media (37) and engage in this new reality using social media to spread evidence-based information. Therefore, it should be advisable to make "VaccinarSì" more active on the social channels, improving the activity and the marketing strategies of its related Facebook account and YouTube channel as well as creating an Instagram account and perhaps a mobile application. The portal implemented among social media platforms could provide a wider audience with authoritative scientific information and reach also new generation of parents that through social media could be informed, empowered and engaged (38). Recently, social media platforms have become increasingly popular

as a source of health information among the Italians (39). It has already been suggested that social networking services could become powerful health information channels and, eventually, be more effective than classic mass media (40). Actually, they have already been demonstrated to represent a useful intervention tool to positively influence parental decisions about vaccines and vaccination (41). Given their high accessibility, social applications could serve as effective information tool, allowing users to get more involved and engaged (42) and it has been proved that, the more actively involved and engaged in their healthcare patients are, the greater trust to medical practice and better health outcomes they experience (43). Furthermore, social media might also serve to customize public health education, which is targeting with tailored messages specific groups of population, based on socio-demographic characteristics or other aspects (44).

The strength of our study is the large period of study and the size of population involved, that allowed us to observe and describe trends in connection with epidemiological and political events. To our knowledge, it is the first study of this kind in Italy, conferring originality to our work.

This study has also some limitations to be pointed out. Firstly, the data we analyzed were provided by Google Analytics as aggregate, which meant we were not able to carry on a multivariate analysis to find out predictors of abandonment or engagement with the portal. Individual characteristics of users could have given better informations on visitors' behavior and how to improve more efficiently the marketing strategy of the platform. Secondly, we inferred users' engagement drawing on some indicators that could lead to misinterpretation, since behavior and interaction with the portal may be due to several reasons. Probably, a brief form at the end of each webpage, asking

the user about its usefulness, could help interpreting visitors' behavior.

Conclusions

The "VaccinarSì" portal, over the six years of its activity, has increased its popularity and gained satisfying visibility. Since it already seems to serve as a useful tool for healthcare workers, additional advertising campaigns could further increase its fame among general population. A remarkable changing in some connections features has occurred gradually but constantly over the six years analyzed and involved all users, suggesting a worsening in level of engagement with the portal. This might be due to the relevant change in devices used to access, with a conspicuous dissemination of mobile phones or, even more likely, to a new seeking behavior looking for fast-pace information. In order to reach a larger audience and optimize visitors' engagement, it would be advisable to develop renewed marketing and communication strategies, such as revamping the graphic interface for smartphones or creating a related mobile application. Moreover, some related social media profiles (Facebook, Instagram and YouTube) should be implemented perhaps using brief and appealing contents, also redirecting to the master webpage. Finally, the portal and the media applications should be continuously updated, especially during specific news events, for instance a disease outbreak or a 'fake news' dissemination, to promptly counteract misinformation. This study highlights the importance of assessing the effectiveness of a website as Public Health intervention and suggests the potential of Google Analytics as evaluation method, because it is easy to implement even if resources are limited. This could lead to further expansion of these internet-delivered interventions within the field of health promotion.

Riassunto

Sei anni di attività del portale VaccinarSì: valutazione del traffico web con Google Analytics

Premessa. Nonostante il generale consenso della comunità scientifica riguardo la sicurezza e l'efficacia dei vaccini, vi è ancora spesso discordanza tra le evidenze scientifiche e la percezione della popolazione. Il portale "VaccinarSì" è stato creato nel 2013 da specialisti italiani in sanità pubblica per fornire alla popolazione informazioni scientifiche di qualità in tema di vaccinazioni.

Disegno dello studio. Lo scopo dello studio è stato analizzare il traffico web sulla piattaforma "VaccinarSì" per un periodo di sei anni (dall'8 maggio 2013 all'8 maggio 2019). Inoltre, abbiamo confrontato i primi sei mesi con gli ultimi sei mesi di attività del sito per identificare eventuali cambiamenti e potenziali strategie di miglioramento della portale.

Metodi. Lo studio è di tipo descrittivo. Tramite Google Analytics, sono stati raccolti i seguenti dati: numero totale di sessioni sul portale, numero totale di pagine visualizzate, numero totale di utenti e numero di nuovi visitatori, localizzazioni geografiche e dati demografici, tipo di dispositivo utilizzato e modalità di accesso. Abbiamo anche raccolto alcuni parametri che consentono di dedurre il livello di coinvolgimento dei visitatori con la piattaforma: il numero dei visitatori abituali, la frequenza di rimbalzo, il numero di pagine visitate per sessione e la durata media di ogni sessione.

Risultati. Nei sei anni di attività, la popolarità del portale web "VaccinarSì" è progressivamente aumentata, con un notevole incremento di connessioni mensili (oltre 80,000 al mese) provenienti da tutta Italia. I visitatori della piattaforma sono stati principalmente donne (71.1%) di età compresa tra i 25 e 44 anni (64.7%). Una parte considerevole degli accessi è avvenuta da parte di operatori sanitari (50.6%). Il cellulare è diventato il dispositivo più utilizzato per accedere al portale ed è stato utilizzato per il 77.8% degli accessi avvenuti negli ultimi sei mesi analizzati. La ricerca organica (in particolare tramite Google) è la principale modalità di connessione al portale, rappresentando la via di accesso del 92% delle sessioni degli ultimi sei mesi. Gli argomenti che negli

anni hanno riscosso maggiore interesse tra i visitatori sono quelli relativi ai vaccini contro il morbillo, la varicella, il vaccino trivalente MPR e il vaccino esavalente. La pagina relativa a "rischi e benefici reali della vaccinazione" è stata quella complessivamente più visitata da parte degli utenti, pari al 5.67% degli accessi totali e un tempo medio di permanenza di 05:08 minuti.

Conclusioni. Durante i sei anni di attività, il portale ha assistito ad una progressiva diminuzione del livello di coinvolgimento degli utenti, con diminuzione del numero di pagine visitate mediamente ad ogni sessione, una riduzione della durata media di ogni connessione e un aumento della frequenza di rimbalzo. I livelli più bassi di coinvolgimento è stato osservato per le connessioni avvenute tramite dispositivi mobili. I risultati hanno aiutato gli sviluppatori del portale "Vaccinarsi" a valutare strategie future per aumentare ulteriormente la popolarità della piattaforma e ottimizzare il coinvolgimento dei visitatori.

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