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# Media and mistrust of vaccines: a content analysis of press headlines

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**Abstract**
**[ES] Introduction:** Mistrust of vaccines is a serious health challenge. The media can encourage use of effective healthcare services. **Objective:** Examine media coverage of vaccines and identify key features, frames and the tone towards vaccines. **Methodology:** A content analysis of 131 headlines and lead paragraphs about vaccines was conducted in the Spanish print media from 2012 to 2017. **Results**: Headlines were succinct, mean of 8.5 words (range: 1-19, SD: ± 3.5). Positive headlines were more frequent than neutral and negative ones, and while negative headlines remained unchanged ($p = .163$), positive and neutral ones increased significantly ($p < .001$, $p = .037$ respectively). The most frequent words related to a) actors involved in vaccination; b) specific vaccines; c) actions related to vaccination; and d) research. **Conclusions:** Positive and neutral headlines towards vaccination have increased. Findings may contribute to the broader task of improving media practices in times of anti-vaccine lobbies.

**Keywords**
**[EN]**: vaccines; media; public health; newspaper; mistrust; headline.
**[ES]**: vacunas; medios; salud pública; periódico; desconfianza; titular.

**Contents**

## 1. Introduction

The use of vaccines in healthcare services are considered one of the major scientific developments in the history of human being. The societal and economic impact of vaccine preventable diseases are well reported (Goodyear-Smith, Petousis-Harris, Vanlaar, Turner, & Ram, 2007). Vaccination uptake has greatly reduced mortality especially during the last century when vaccination around the world eliminated most of the diseases that used to cause high mortality rates (Rappuoli, Mandl, Black, & De Gregorio, 2011). However, mistrust in vaccines is today a serious public health challenge as recognized by the former World Health Organization's (WHO) Director-General Margaret Chan, who expressed concerns over what she called a "worrisome" public mistrust of vaccines (Margaret Chan, 2011). In Europe, vaccine uptake is decreasing and in some countries the level is close to the minimum required immunization completion rates of 80% – 90%, such as in Italy, France and Portugal (Carrillo-Santisteve & Lopalco, 2012). Now, France and Italy have established obligatory vaccination in childhood and other European countries are considering similar measures to increase vaccine coverage.

A recent study has asked for additional measures in Europe to improve vaccine coverage in all age groups (Sheikh *et al*., 2018). Success in vaccine uptake requires multifaceted approaches. Many aspects are crucial to reach and maintain high vaccine coverage where different actors play an important role: parents, caregivers and clinicians. These are influenced by certain environmental elements such as policy and legislation, education, socioeconomic conditions, and by mass communication (Abdelmutti & Hoffman-Goetz, 2010; Casciotti, Smith, Andon et al., 2014; Goodyear-Smith *et al.,* 2007). The media have been considered as an important tool for communicating information about vaccines, increasing awareness and motivating the public to make important decisions about their health care (Casciotti, Smith, Tsui, & Klassen, 2014; Catalán-Matamoros, 2017). Indeed, it has been revealed that after people complete their school education, the mass media become the most important source of information and, for many people, the only source when it comes to science, scientific processes and scientific findings (Riobó, 2016). A previous Cochrane review revealed that the media should be considered in the field of vaccines as it can encourage use of effective healthcare services and discourage those of unproven effectiveness (Grilli, Ramsay, & Minozzi, 2002).

Some now-discredited claims about vaccine safety have attracted extensive media attention in the last decade, and previous studies have investigated the media coverage of vaccines. A recent systematic review analysed communication of vaccines in the traditional media (Catalán-Matamoros & Peñafiel-Saiz, 2018). The authors examined 24 studies and found that the majority of media analyses had been done in newspapers especially from the United States. Moreover, negative messages and inaccurate information was found to be a common pattern in media coverage of vaccines. This review suggested a research agenda in the field asking for more studies in other geographical areas. As it was shown in the systematic review, United Kingdom is the only European country where more content analyses of media coverage about vaccines had been conducted. Three articles have been conducted in Spain analysing media communication, one was focused on media contents about smallpox (Martínez-Martínez, Tuells, & Colmenar-Jarillo, 2015) and two were focused on the human papillomavirus

vaccine (Camaño Puig & Martí Jiménez, 2017; Tuells *et al.*, 2013). Our study meets some research gaps in the field of public communication of vaccines by deepening our understanding of media coverage from a general perspective including all types of vaccines in Spain, the fifth largest country in the European Union by population.

The reach of the print media in Spain is wide, covering most homes in all regions at least once per week (including free newspapers). In our study we analysed the vaccine related coverage of two national newspapers *El País* and *El Mundo* which are the two paid general newspapers with the highest circulation rates, *El País* with a 1.080 and *El Mundo* with a 0.662 million daily readership rate (AIMC - Asociación para la investigación de medios de comunicación, 2017). Today, both newspapers are generally regarded as liberal, but in the past *El País* was viewed as ideologically left-center and *El Mundo* as right-center. We selected newspapers because despite competition from online and social media, traditional media remains a popular and widely trusted source of information (Catalán-Matamoros & Peñafiel-Saiz, 2017). In addition, online sources include information about science from credible or non-credible sources. However, when seeking credible, evidence-based and independent sources, laypersons still turn and trust to established traditional media (Guenther, Bischoff, Löwe, Marzinkowski, & Voigt, 2017).

### 1.2. Research questions

The above literature review demonstrates that little research has focused on the media contents of vaccines. Hence, the aim of the study is to examine the media coverage of vaccines and identify key features, frames and the tone towards vaccines or vaccination. Therefore, in order to gain a more complete understanding of the media coverage of vaccines, we conducted content analysis to answer the following research questions.

First, considering than far more media consumers read headlines only than full-text articles (Dor, 2003), in our study we have analysed headlines and lead paragraphs of vaccine-related articles. These specific contents are the most visible ones especially in the Internet era when headlines are tweeted and shared by millions of people daily. In newspapers, the relevance of headlines is magnified by the fact that they are composed by editors rather than by reporters seeking to attract readers while still appointing into their prior beliefs and expectations. Headlines are thus shaped by non-specialist editors with non-specialist readers in mind and are consequently more likely to reflect prevailing societal beliefs (Bleich, Stonebraker, Nisar, & Abdelhamid, 2015). Therefore, headlines differ in significant ways from the full text of the article and have an independent impact on readers' perceptions of events (Ifantidou, 2009). We believe that the analysis of wording used in headlines may be pertinent as it could shed light on key perspectives that are used by journalists. Finally, although there are some few brief analyses of headlines about vaccines-related coverage (Hilton, Hunt, Langan, Bedford & Petticrew, 2010; Hussain *et al.*, 2011; Kelly, Leader, Mittermaier, Hornik & Cappella, 2009; Quintero Johnson, Sionean & Scott, 2011; Quintero Johnson *et al.*, 2011; St. John, Pitts & Adams Tufts, 2010), we have only found two studies analysing media headlines about vaccines as the central research question, one focusing on the meningococcal B vaccine (Turner, York, & Petousis-Harris, 2009), and the other one on the human papillomavirus vaccine (Camaño Puig & Martí Jiménez, 2017). As it has been previously argued (Larson, Cooper, Eskola, Katz, & Ratzan, 2011), there is need to conduct research in other international settings, as vaccine safety issues can make headlines worldwide with potentially negative consequences on vaccine uptake. Based on the aforementioned assumptions, and

due to the paucity of research on headlines about vaccines (Turner *et al.*, 2009), it is our effort to address an important theoretical gap in the current research by answering the following research questions in the Spanish print media:

> *Q1. What are the key features of headlines and lead paragraphs in media coverage about vaccines?*

Second, in relation to the tone of the article, previous research has revealed that the headline and lead paragraph are central areas that act to anchor the most newsworthy aspect of the story, its main trajectory and encapsulate what the journalist might consider most important (Champion & Chapman, 2005). The tone has been used to determine, from a public health perspective, whether vaccine was being supported or advocated (Tsuda *et al.*, 2016). For example, headlines with a negative tone towards vaccination questioning vaccine safety may significantly increase parental concern and vaccine hesitancy. And third, frame analysis is relevant since they have the potential to shape public health by influencing the information environment in which vaccines are understood, accepted, adopted, and eventually routinized (Quintero Johnson *et al.*, 2011). The frames that journalists construct when delivering news information about vaccines have the capacity to influence the public's knowledge and behaviors about vaccination. In relation to our study, research often emphasizes that the most obvious or dominant frames are typically determined by the headline and lead paragraph (Weaver, Lively, & Bimber, 2009). Due to the relevant of framing and tones in the public ideology about a certain issue, our next research questions read as follows:

> *Q2. What is the tone of headlines and lead paragraphs in print media toward vaccines or vaccination?*
> *Q3. What are the frames that are most common among headlines and lead paragraphs in the print media coverage about vaccines and vaccination?*

## 2. Methods

### 2.1. Methodological strategies

This study draws on a content analysis of the media coverage about vaccines or vaccination in the Spanish print media. Traditionally, content analysis has been used as a descriptive tool to identify characteristics of messages (Iyengar & Simon, 2000).

### 2.2. Sample selection

In our study we analysed any vaccine-related article that has been published by two major national newspapers in Spain: *El País* and *El Mundo*. From each of these articles we used *MyNews* to extract all headlines and lead paragraphs from from October 1 2012 to October 1 2017. By 'lead paragraph' we also include the term 'sub-title'. The online database *Mynews* is a professional media agency that inspects all national daily newspapers and provides copies of all articles. The database were searched using the following search string in the Spanish language [vacuna* OR inmuniza*] that should be present in the headlines and subheadlines or lead paragraphs. Nowadays far more media consumers read headlines than full-text articles, therefore by analysing headlines instead of full articles, we are able to efficiently tap into a data-set that both reflects and influences common perceptions about the

vaccines coverage (Bleich *et al.*, 2015). The article types selected were news articles, features, short articles, opinion articles (including editorials and letters to the editor), interviews, biographies and obituaries. Duplicate articles and those using the term "vaccine" with a metaphoric meaning were excluded.

### 2.3. Analysed variables

The content analysis was conducted using QSR NVivo (v. 11 plus). We draw on a coding system to identify word frequencies that are considered as flashpoints in vaccine-related discourses. Our content analysis determines the frequency of these keywords as well as the association with other topics, since the same message could make reference to more than one topic. A trained person conducted the content analysis by using a standardized data-collection instrument to record the type of article (news article, feature, opinion article, etc.), publication date, author, vaccine type, words number and space occupied. Aligned to previous research (Hilton *et al.*, 2010), the tone was employed primarily to assess whether, from a public health perspective, vaccine was being supported or advocated. For coding 'tone' we followed a previous study (Tsuda *et al.*, 2016) where positive tone was coded if they focused on benefits, such as disease prevention, neutral if they were not in favour or against vaccination, and negative if they focused on risks, such as adverse events and discouragement of the vaccination. The frames were also coded following a deductive method. The following five news frames that have been identified in previous studies were thus deductively investigated (Semetko & Valkenburg, 2000): conflict, human interest, economic consequences, morality and responsibility.

### 2.4. Procedure

In each of the identified articles, each headline and lead paragraph, when available, was read and re-read, looking for key words related to whether vaccination was presented in a positive, neutral or negative perspective, as well as to identify the frames. After the first reading and coding, the next step was to identify the connotative or latent meaning. This process of coding enabled us to move beyond the surface meaning of the stories to their underlying meaning.

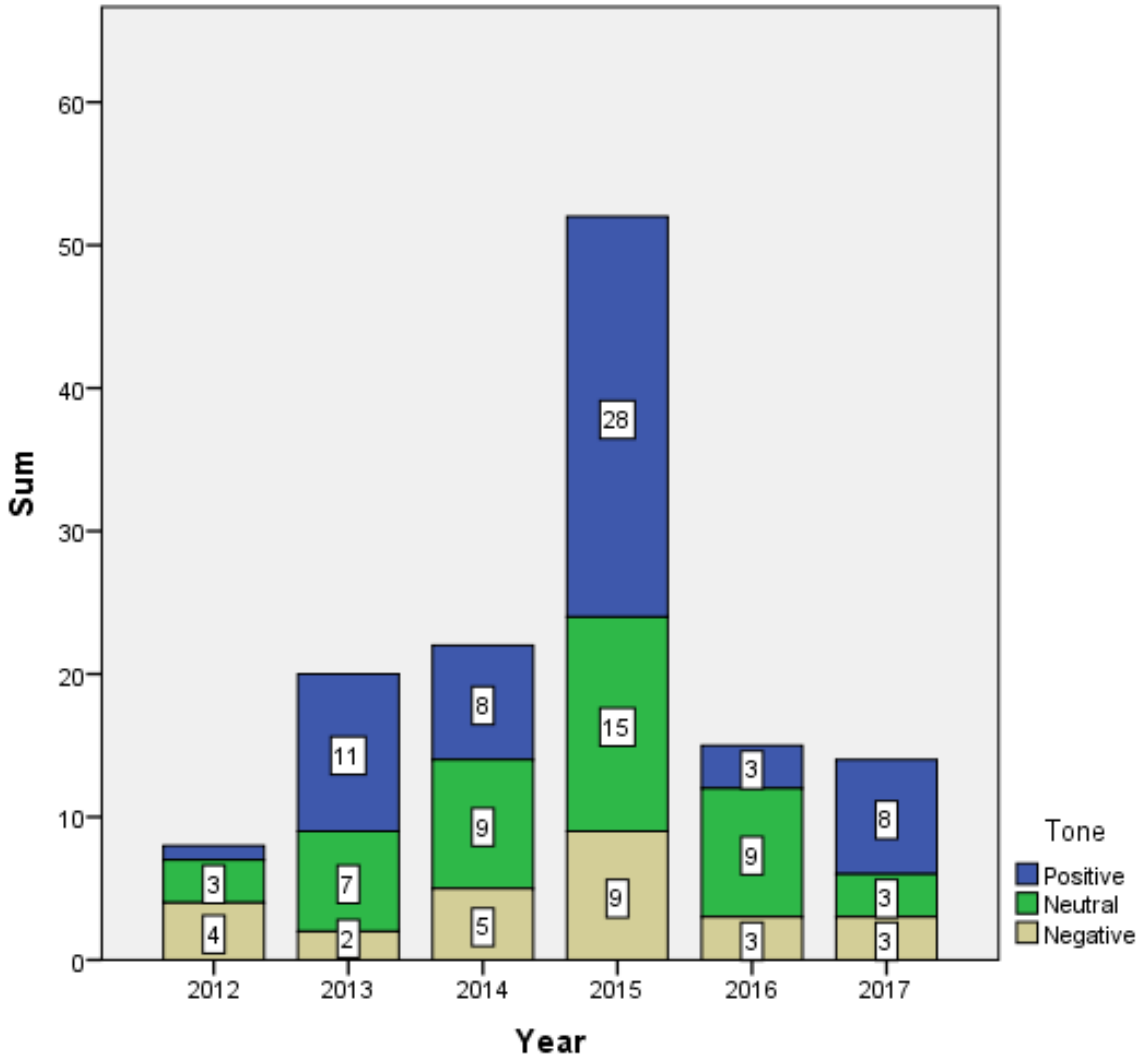
In order to ensure reliability in coding, data was coded first by one author (DCM), followed by a second coder (CSO), who randomly reviewed 15% of the articles to determine intercoder reliability. The average simple agreement for all variables included in the study was found to be 82.02% (range: 71% - 100%). The formula outlined by Miles and Huberman (1994) is reliability = number of agreements (same coding)/total codes (agreements + disagreements). The average kappa score was 0.75. After intercoder reliability testing was completed, changes were made to the coding scheme to reflect any disagreements that had been identified and all discrepancies were resolved with the support of a third researcher when necessary.

Finally, data was further analyzed using Excel (Microsoft Corporation, Redmond, WA, USA) and SPSS 24$^{th}$ edition (SPSS Institute, Inc., Chicago, IL, USA). These programs were used to conduct the data descriptive analyses and to find *p* values to check for the significance of results when making comparisons.

## 3. Results

A total of 159 articles appeared between 2012 and 2017. From those, 28 were not considered because they were duplicates, brief mentions in the list of contents, or because the term vaccine had a metaphoric meaning such as "Brexit, more vaccine and less infection" (*El Pais*, 17.07.2016). Therefore, the final sample included 131 articles. *El Pais* carried 75 articles and *El Mundo* printed 56, with no significant differences among them ($\chi^2$ = 2,756; p = 0.97; df = 1). There was one particularly heavy period of press coverage about vaccines in 2015, during which the selected newspapers printed 52 articles (*El Pais* n = 27, *El Mundo* n = 25). The volume of publications in 2015 was significantly higher compared to the other years of analysis ($\chi^2$ = 55,550; p = < 0.001; df = 5). During these other years (2012, 2013, 2014, 2016 and 2017) they published a similar number of articles without significant differences among them ($\chi^2$ = 7,646; p = .105; df = 4).

**Figure 1. Yearly distribution by headline/lead paragraph tone (p = < 0.001).**



Of the headlines and lead paragraphs that were included in the study, 2402 words were analysed, 1040 words were headlines. 1193 words were published by *El Mundo* from which 446 words were used in headlines. 1209 words were published by *El País* from which 594 words were in headlines. Headlines had a mean number of 8.5 words (range: 1-19, SD: ± 3.5). Lead paragraphs had a mean number of 11.0 words (range: 0-75, SD: ± 12.0). *El País* and *El Mundo* were not different in relation to the length of the headlines with a mean number of words 8.0 versus 9.1 respectively ($t$ = -1.71; p = 0.090; df = 129). However both newspapers showed significant differences in relation to the length of the lead paragraph ($t$ = -2.89; p = 0.005; df = 129) as *El País* had a mean of 8.4 words *versus* 14.4 words *by El Mundo.*

The tone analysis for headlines and lead paragraphs that was also conducted revealed that 45% (n = 59) of articles were positive, 36% (n = 47) were neutral and 19% (n = 25) negative. Therefore, the overall proportion of pro-immunization was significantly higher than that of anti-immunization media in the total sample period. In Figure 1 we can find the yearly distribution of articles according to the tone analysis. We found that, during the period of 2012 that was included in our analysis, the negative tone (n = 3) was most frequent than the positive tone (n = 1), and that the number of headlines or lead paragraphs with negative tone remained similar throughout the study period with no significant differences ($\chi^2$ = 7.89; p = .163; df = 5). However, the number of both positive and neutral tones significantly changed during the study period, especially in years 2013, 2014 and 2015 (positive articles: $\chi^2$ = 47.07; p = <.001; df = 5; neutral articles: $\chi^2$ = 11.85; p = .037; df = 5).

**Table 1. The most frequent words in the analysed headlines and lead paragraphs.**

| | **Most frequent words* in the full reviewed sample** | **Most frequent words* in the positive tone sample** | **Most frequent words* in the negative tone sample** | **Most frequent words* in the neutral tone sample** |
|---|---|---|---|---|
| **Words** | Vaccine, against, children, health system, chicken pox, influenza, meningitis, years, cancer, Spain, pharmacies, parents, virus, schedule, cases, Ebola, effective, trial, health, zika, director, dose, study, experts, millions, first, sell, malaria, polio, protect, campaign, letters, success, medicine, group, infection, medical doctors, obligatory, protection, public, rates. | Vaccine, against, children, meningitis, parents, virus, cases, health system, schedule, effective, pharmacies, infection, obligatory, first, protection, influenza, approve, dose, Spain, study, success, pregnant women, youth, millions, lives. | Vaccine, against, influenza, years, Spain, rate, health system, chicken pox, error, elderly, campaigns, experts, group, pediatrics, little, sell. | Vaccine, against, chicken pox, cancer, Ebola, zika, director, Yeats, United States, trials, pharmacies, medicine, children, number, health, health system, Brazil, influenza, Liberia, tuberculosis, tumor, now. |

Table 1 shows the terms that were used in the study sample. We can identify four specific group of terms in relation to a) actors involved in vaccination: health system, Spain, pharmacies, parents, director, experts and medical doctors; b) specific vaccines: *chicken pox, influenza, meningitis, cancer, Ebola, zika, malaria* and *polio*; c) actions related to vaccination: *against, schedule, cases, dose, sell, protect, campaign, letters, medicine, infection, obligatory, protection* and *rates*; and d) research: *effective, trial, study, success* and *group*. In addition, a special analysis has been conducted to determine term differences according to the tones. Interestingly, in negative tones we found the term *paediatrics* instead of *children* which was most frequently used among positive and neutral tones. Other terms included in negative tone headlines or lead paragraphs not being present among neutral and negative tone ones were *campaigns, elderly, error, experts, group, little, pregnant women, rate* and *sell.* Among neutral tone headlines these were the most representative terms: *director, medicine, now, number* and *trials.* And the terms used only among the positive tone ones were: *parents, virus, schedule, effective, infection, obligatory, first, protection, approve, dose, study, success, pregnant women, youth, million* and *live.*

In table 2 we can find the distribution of frames by the tone in the headlines and lead paragraphs, where we can see that negative articles were presented mostly under the conflict frame (n = 19). In contrast, positive articles were presented throughout all types of frames, with a higher frequency for "human interest" (n = 34), similarly to neutral tone articles.

**Table 2. Frames by tone in relation to headlines and lead paragraphs**

| | **Frames** | | | | | |
|---|---|---|---|---|---|---|
| | Human interest | Responsibility | Conflict | Morality | Economic | Total |
| Positive | 34 | 5 | 14 | 4 | 2 | 59 |
| Neutral | 25 | 6 | 8 | 1 | 6 | 46 |
| Negative | 6 | 0 | 20 | 0 | 0 | 26 |
| Total | 65 | 11 | 42 | 5 | 8 | 131 |

To provide a sense of each of the coding categories of the three tones and the five frames, Table 3 includes examples of headlines coded each category:

**Table 3. Examples of headlines by tone and frame**

| Tone | Headline |
|---|---|
| Positive | "A safe vaccine for hepatitis C" (El Mundo, 6 November 2014, p.37)<br>"A new vaccine: even more effective" (El Mundo, 13 April 2015, p.52)<br>"Discarded any relationship between vaccines and autism" (El País, 22 April 2015, p. 35)<br>"Life with HIV, better thanks to a vaccine" (El Mundo, 17 February 2016, p. 31) |
| Neutral | "Spain will have a common schedule with eight vaccines" (El País, 20 March 2013, p. 36 & 37)<br>"The vaccine against meningitis B arrives in pharmacies in October" (El País, 23 November 2015, p. 22)<br>"When the vaccine arrives in a drone" (El Mundo, 7 November 2016, p. 38)<br>"This is how the cancer vaccine is being created" (El País, 24 March 2017, p. 28) |
| Negative | "Withdrawals Novartis flu vaccines" (El País, 26 October 2012, p. 40)<br>"Hard vaccine" (El País, 6 January 2013, p. 28)<br>"Health Ministry and paediatricians don't agree on the limits of the chicken pox vaccine" (El Mundo, 19 April 2014, p. 14)<br>"Experts disagree about the chicken pox vaccine" (El País, 23 July 2015, p. 21) |
| **Frames** | |
| Human interest | "Hilary Koprowski, author of the first vaccine against Polio" (El País, 24 April 2013, p. 52).<br>"Meningitis vaccine, already in pharmacies" (El Mundo, 24 March 2017, p. 30) |
| Responsibility | "The girl deceased by meningitis, without being vaccinated" (El Mundo, 5 April 2017, p. 39).<br>"Vaccination is to protect" (El País, 8 June 2015, p. 10) |
| Conflict | "Spain has two million expired pox vaccines" (El País, 21 June 2016, p. 34)<br>"Public health practitioners, against the chicken pox infant vaccine" (El Mundo, 21 July 2015, p. 30) |
| Morality | "Vaccination of children cannot be an arbitrary decision of their parents" (El Mundo, 5 June 2015, p. 3)<br>"Let's give away vaccines" (El País, 24 February 2013, p. 36) |
| Economic | "Vaccinating males against papilloma is profitable" (El Mundo, 13 April 2015, p. 52)<br>"300 million for a vaccine" (El País, 6 August 2015, p. 9) |

## 4. Discussion and conclusions

This paper explored the media coverage of vaccines through a sample of national print media by means of content analysis. The aim of the study was to examine the media coverage of vaccines and identify key features, frames and the tone towards vaccines or vaccination. Taken together, our findings show key patterns in the coverage of vaccines and identify significant features. More specifically, our content analysis has analysed headlines and lead paragraphs of 131 articles related to vaccines in the largest general paid newspapers from 2012 to 2017. This study demonstrates that the overall proportion of articles with a positive or pro-immunization tone was significantly higher than that of negative or anti-immunization tone in the total sample. However, when looking at the yearly distribution, the negative tone was the most frequent in 2012, but in the coming years, we identified a significant increase of both positive and neutral tone in headlines and lead paragraphs, while messages with negative tone remained without significant differences in the study period. In addition, we found four categories of most common words used in the sample: a) actors involved in vaccination, b) specific vaccines, c) actions related to vaccination, and d) research. The study also revealed that the most common frames were human interest and conflict, and that negative tone articles were mostly presented under the conflict frame.

In relation to the first research question, our study shed light on key patterns of the media coverage of vaccines in relation to the headlines and lead paragraphs. Primarily, we explored quantitative characteristics. We found that the headlines included a mean number of 8.5 words, without significant differences between both newspapers. With these regards, it has been suggested that a headline should not be longer than 10 words to ensure clarity and a higher impact in readers (Gómez Mompart, 1982). Our study is aligned with this suggested length in the headlines of both newspapers. Additionally it is worthy to mention that the lead paragraph or subtitle were significantly different between both newspapers, being longer in *El Mundo*, showing how this newspaper provided more descriptions in this highlighted text. However, *El País* published more vaccines-related articles, 75 *vs* 56, although this difference was not significant. This finding confirms previous research that has also found more health-related articles in *El País* when it was compared to other newspapers in the Spain (Barcoj-Ramírez, 2016; Martínez Rubio, 2016).

During the analysis period, we significantly identified more vaccine-related headlines in 2015, when it was compared to the other years of the study period (2012-2017). In fact, during this year there was a wide number of public health events and media debates about vaccines. The most frequent types of vaccines that were highlighted during 2015 were for diphtheria, chickenpox, whooping cough, meningitis B and measles. With regards diphtheria, the alarm was developed after a new case in a non-vaccinated child was found in Spain after 28 years. As a result, the media focused on parents' responsibility in the vaccination of their children. In relation to the chickenpox, the Ministry of Health decided to only provide teenagers that had not passed the disease with the vaccine. That the disease was mild and easily overcome among children was the primarily argument, in addition of costs reduction. Both supporters and opponents led to a large debate in the public health sector, and the Ministry decision was finally revoked in 2016, so the vaccine was again included in standard immunization programs. With regards to whooping cough, a newborn died because the vaccine was not available and the pharma company confirmed supply problems with this vaccine. In relation to meningitis B, the vaccine was authorized in 2013 by the European Commission, and, in 2015, the Spanish authorities recommended that, excluding an outbreak, only population groups at risk should

be vaccinated. This decision produced a large debate among pediatricians, as Spain was the country with the fifth highest incidence in Europe according to the European Centre for Disease Prevention and Control (ECDC, 2015). Measles was brought to the attention of the Spanish media due to the outbreak in Disneyland, with more than 70 infections. Once again, the media highlighted the importance of vaccination in terms of preventing measles. In some of the aforementioned media debates, we observed that headlines and lead paragraphs largely focused on opposed government decisions by public health experts, pediatricians, etc. In relation to this, Dr. Ildefonso Hernandez, former general director of Public Health at the Spanish Ministry of Health, argued that "all members of the advisory committee of the Spanish Association of Pediatrics have recognized conflicts of interest with companies producing vaccines" (El Mundo, 2014). As it was not the aim of our study, we suggest that further research should explore these tensions between regulatory bodies and the industry.

With respect to the analysis of the use of words, it revealed four categories. The first one represents the actors that may play a role in vaccination by using words such as *experts* and *parents*. The second category showed specific vaccines names such as *chicken pox, influenza and meningitis*. The third category showed actions related to vaccination where the used of words such as *against, schedule, cases, dose,* or *protect* were frequent. The last category addressed terms related to research such as *effective, trial* and *study*. With regards to the first category, the use of the term *experts*, science journalists often quote different experts in a variety of ways, but they consider scientists to be particularly credible and more reliable than other types of sources (McIntosh White, 2006). In relation to *parents*, as they are the key actors in childhood vaccination, we believe that including this group of population in the headlines might be an effective strategy to attract their attention. In this regard, previous authors (St. John *et al.*, 2010) stated that science journalists tend to prioritise information from institutional sources within the government and business spheres, and that citizens are paid little attention in news construction. Guidelines for public/civic journalism (Haas, 2007) suggest the use of additional views beyond scientific experts to aid in improving issues of civic participation. Recognising other players can mark the entrance of new topics and views, thus by the headlines that we have analysed, we can anticipate that views from experts and parents might be present. With regards to research in the field of public communication of vaccines, it has largely studied the media communication of the human papillomavirus vaccine (Catalan-Matamoros & Peñafiel-Saiz, 2018). Interestingly, it is in contrast with our findings as this vaccine was not mentioned more frequently than others such as the ones for the chicken pox, influenza and meningitis. Therefore further research should also focus on other types of vaccines that have been poorly investigated such as the vaccines for Ebola, zika and malaria. Another analysis was conducted by grouping the most frequent words according to tone of the headline or lead paragraph. Interestingly, in negative messages we found that the word *paediatrics* was used instead of *children* that was most frequently used in positive or neutral messages. This shows how the health system perspective is the most frequent focus in negative messages instead of vaccine users.

The second research question asked about the tone of headlines and lead paragraphs toward vaccine or vaccination. In answer to this research question, our analysis indicated that the readers were provided mostly with positive and neutral messages towards vaccination. Our results are in contrast with other studies that found more negative messages towards vaccination (Goodyear-Smith et al., 2007; Hussain et al., 2011; Penta & Baban, 2014). Negatively disposed messages might in itself be more powerful in the media than the positive ones, consistent with the well-known research that claims that 'bad is stronger than good' (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). On the other

hand, in headlines with positive tone, a previous study that analysed the tone of media coverage of the human papillomavirus vaccine found that articles reporting positive messages were more likely to include important detailed information than articles with neutral or negative tones (Perez, Fedoruk, Shapiro, & Rosberger, 2016). The same study also found that neutral headlines were more descriptive, rather than evoking strong positive or negative associations with the vaccine. Another study found significant correlations showing that articles with a negative headline were significantly more likely to mention safety as an issue and to have a lower number of correct facts presented, which should be read as less in-depth factual information being contained in the article (Cooper Robbins, Pang, & Leask, 2012).

A notable aspect in our study is that negative headlines were more frequent than positive and neutral ones in 2012. During this year, headlines focused on important vaccine issues: the problems of the Novartis flu vaccines, the WHO stop of the anti-polio campaign in Pakistan due to Taliban attacks, and problems on the research of the Malaria vaccine. However, after 2012, the positive and neutral tone significantly increased whereas the negative tone remained the same during the whole study period. This could be a sign of how journalists have become more aware about vaccines as an important public health challenge. In fact, this could be an achievement of public health strategies towards journalists as it has been previously suggested the need for an effective collaboration of researchers, health care providers, and policymakers with journalists to disseminate complete and accurate vaccine information (Perez *et al*., 2016; Catalan-Matamoros, 2015).

In relation to the third research question, we found a majority of 'human interest' and 'conflict' frames. The first, the most frequent among all the analyses, is further described as the human impact frame (Semetko & Valkenburg, 2000). For example, those headlines employing personalization of an event, applications of new research studies on vaccines, or others showing a clear impact on human beings, they were framed as 'human interest'. The frame 'conflict' was the second most popular frame and, among our analyses, it mainly represented when headlines or lead paragraphs showed discrepancy between parties/individuals/groups. Our findings are aligned with previous authors who confirmed that 'human interest' and 'conflict' are one of the most commonly utilized frames (Wendorf Muhamad & Yang, 2017). Other frames were not frequent in our sample such as 'responsibility' and 'morality'. However, it has been argued that attribution of responsibility is one of the most important frames for communicating health issues (Hallahan, 1999). Taking this outcome into account and since frames are important as they have the ability to bring the reader's attention to specific features, further research on frames in the field of vaccines is needed.

Despite these interesting findings, some potential limitations of the study should be considered when interpreting the results. First, although the analysis of headlines offers important data, we do not believe that focusing on headlines alone is sufficient for understanding the entirely media landscape of vaccines. As it has been earlier suggested, while headlines help structure readers' interpretation of the subsequent text, they do not determine it (Bleich *et al.*, 2015). Moreover, some studies have found that headlines are frequently incomplete or ambiguous summaries of the article that follows, and that readers often bring their own ad hoc interpretive schemas to bear when interpreting them (Ifantidou, 2009). In addition headlines are frequently developed by subeditors independently of the journalists who write the articles, and hence there can be quite a difference in intent between the headline and the article (Turner *et al.*, 2009). However, we believe that headlines are still an important content in news articles and as it was previously mentioned, most media consumers read headlines only instead of full-

text articles (Dor, 2003). Another important aspect is that we should recognise that we focus on newspapers and therefore we do not attempt to completely cover the media landscape including radio, television, internet, etc. Still, newspapers can be a rather good indicator, thereby providing insight into what could be felt elsewhere (Meyer *et al.*, 2016). Another significant limitation is that this work does not attempt to assess the effect of the sources included in these articles on readership. In reference to this, research is limited when it comes to determining whether exposure to headlines influences actual viewpoints, attitudes or behaviours. Therefore, we would recommend that future research analyse the impact of sources on opinions. Another point is that we only analysed coverage in national newspapers, and significant differences between national and local/regional coverage have been previously found (Boumans, Vliegenthart, & Boomgaarden, 2016) therefore further research should focus on these other media types and formats. Nevertheless, we believe that the present study provides a solid starting point for understanding journalistic practices in relation to media communication of vaccines and vaccination, an increasing public health challenge in our current society.

In conclusion, our results adds new knowledge to the limited understanding of media communication of vaccines in countries with little previous research in the field, and especially deepening on headlines where international research has not been deeply developed yet. It is hoped that this comparative research can contribute to the broader task of improving news media practices within and across national media systems for the benefit of their citizenries in times of anti-vaccine lobbies. Finally, it would be immature to recommend that journalists should only report differently on vaccines and in doing so promote the social acceptance of vaccination. A number of factors conspire to make it very difficult to achieve this goal. However, we believe that by advancing understanding of the headlines patterns about vaccines, our study can contribute to current public health challenges by shaping public awareness in further vaccination campaigns.

## 5. List of References

Abdelmutti, N., & Hoffman-Goetz, L. (2010). Risk Messages about HPV, Cervical Cancer, and the HPV Vaccine Gardasil in North American News Magazines. *Journal of Cancer Education*, *25*(3), 451–456. https://doi.org/10.1007/s13187-010-0087-9

AIMC - Asociación para la investigación de medios de comunicación. (2017). *Estudio General de los Medios en España 2017.* Madrid, Spain: AIMC. Retrieved from http://www.aimc.es/-Datos-EGM-Resumen-General-.html

Barcoj-Ramírez, M. del C. (2016). Noticias sobre lactancia materna en la prensa nacional = Breastfeeding news in the national newspapers. *Revista Española de Comunicación En Salud*, *7*(1). https://doi.org/10.20318/recs.2016.3153

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323–370. https://doi.org/10.1037//1089-2680.5.4.323

Bleich, E., Stonebraker, H., Nisar, H., & Abdelhamid, R. (2015). Media Portrayals of Minorities: Muslims in British Newspaper Headlines, 2001–2012. *Journal of Ethnic and Migration Studies*, *41*(6), 942–962. https://doi.org/10.1080/1369183X.2014.1002200

Boumans, J. W., Vliegenthart, R., & Boomgaarden, H. G. (2016). Nuclear voices in the news: A comparison of source, news agency and newspaper content about nuclear energy over time. *European Journal of Communication*, *31*(3), 260–282. https://doi.org/10.1177/0267323116629879

Camaño Puig, R., & Martí Jiménez, E. (2017). La vacuna del Virus del Papiloma Humano en los titulares de prensa. *Estudios Sobre El Mensaje Periodístico*, *22*(2). https://doi.org/10.5209/ESMP.54262

Carrillo-Santisteve, P., & Lopalco, P. L. (2012). Measles still spreads in Europe: who is responsible for the failure to vaccinate? *Clinical Microbiology and Infection*, *18*, 50–56. https://doi.org/10.1111/j.1469-0691.2012.03982.x

Casciotti, D. M., Smith, K. C., Andon, L., Vernick, J., Tsui, A., & Klassen, A. C. (2014). Print News Coverage of School-Based Human Papillomavirus Vaccine Mandates. *Journal of School Health*, *84*(2), 71–81. https://doi.org/10.1111/josh.12126

Casciotti, D. M., Smith, K. C., Tsui, A., & Klassen, A. C. (2014). Discussions of adolescent sexuality in news media coverage of the HPV vaccine. *Journal of Adolescence*, *37*(2), 133–143. https://doi.org/10.1016/j.adolescence.2013.11.004.

Castillo Esparcia, A; P López Villafranca, MC Carretón Ballester (2015): "La comunicación en la red de pacientes con enfermedades raras en España". Revista Latina de Comunicación Social, 70, pp. 673 a 688. http://www.revistalatinacs.org/070/paper/1065/35es.html DOI: 10.4185/RLCS-2015-1065

Catalán-Matamoros, D. (2015). Periodismo en salud: análisis de los públicos, formatos y efectos (Journalism in Healthcare. Analysis of audiences, formats and effects). *Panacea*, *16*(42), 217–224.

Catalán-Matamoros, D. (2017). El gran avance del ámbito científico y académico de la comunicación en salud = The great development of the scientific and academic field of health communicationn salud. *Revista Española de Comunicación En Salud*, *8*(2), 114. https://doi.org/10.20318/recs.2017.3995

Catalán-Matamoros, D., & Peñafiel-Saiz, C. (2017). The Use of Traditional Media for Public Communication about Medicines: A Systematic Review of Characteristics and Outcomes. *Health Communication*, 1–9. https://doi.org/10.1080/10410236.2017.1405485

Catalán-Matamoros, D., & Peñafiel-Saiz, C. (2018). How is communication of vaccines in traditional media: A systematic review. *Perspectives in Public Health*, *in press*. https://doi.org/10.1177/1757913918780142

Champion, D., & Chapman, S. (2005). Framing pub smoking bans: an analysis of Australian print news media coverage, March 1996-March 2003. *Journal of Epidemiology & Community Health*, *59*(8), 679–684. https://doi.org/10.1136/jech.2005.035915

Cooper Robbins, S. C., Pang, C., & Leask, J. (2012). Australian Newspaper Coverage of Human Papillomavirus Vaccination, October 2006–December 2009. *Journal of Health Communication*, *17*(2), 149–159. https://doi.org/10.1080/10810730.2011.585700

Dor, D. (2003). On newspaper headlines as relevance optimizers. *Journal of Pragmatics*, *35*(5), 695–721. https://doi.org/10.1016/S0378-2166(02)00134-0

ECDC. (2015). Surveillance Atlas of Infectious Diseases. Retrieved March 15, 2018, from https://ecdc.europa.eu/en/surveillance-atlas-infectious-diseases

E*l Mundo*. (2014, April 19). Sanidad y pediatras chocan por los límites en la vacuna de la varicela. *El Mundo*, p. 14.

Gómez Mompart, J. L. (1982). *Los titulares en prensa*. Barcelona: Ed. Mitre.

Goodyear-Smith, F., Petousis-Harris, H., Vanlaar, C., Turner, N., & Ram, S. (2007). Immunization in the Print Media—Perspectives Presented by the Press. *Journal of Health Communication*, *12*(8), 759–770. https://doi.org/10.1080/10810730701672363

Grilli, R., Ramsay, C., & Minozzi, S. (2002). Mass media interventions: effects on health services utilisation. *Cochrane Database of Systematic Reviews*. https://doi.org/10.1002/14651858.CD000389

Guenther, L., Bischoff, J., Löwe, A., Marzinkowski, H., & Voigt, M. (2017). Scientific Evidence and Science Journalism: Analysing the representation of (un)certainty in German print and online media. *Journalism Studies*, 1–20. https://doi.org/10.1080/1461670X.2017.1353432

Haas, T. (2007). *The pursuit of public journalism: theory, practice, and criticism*. New York: Routledge.

Hallahan, K. (1999). Seven Models of Framing: Implications for Public Relations. *Journal of Public Relations Research*, *11*(3), 205–242. https://doi.org/10.1207/s1532754xjprr1103_02

Hilton, S., Hunt, K., Langan, M., Bedford, H., & Petticrew, M. (2010). Newsprint media representations of the introduction of the HPV vaccination programme for cervical cancer prevention in the UK (2005–2008). *Social Science & Medicine*, *70*(6), 942–950. https://doi.org/10.1016/j.socscimed.2009.11.027

Hussain, H., Omer, S. B., Manganello, J. A., Kromm, E. E., Carter, T. C., Kan, L., … Salmon, D. A. (2011). Immunization Safety in US Print Media, 1995-2005. *Pediatrics*, *127*(Supplement), S100–S106. https://doi.org/10.1542/peds.2010-1722O

Ifantidou, E. (2009). Newspaper headlines and relevance: Ad hoc concepts in ad hoc contexts. *Journal of Pragmatics*, *41*(4), 699–720. https://doi.org/10.1016/j.pragma.2008.10.016

Iyengar, S., & Simon, A. F. (2000). New perspectives and evidence on political communication and campaign effects. *Annual Review of Psychology*, *51*, 149–169.

Kelly, B. J., Leader, A. E., Mittermaier, D. J., Hornik, R. C., & Cappella, J. N. (2009). The HPV vaccine and the media: How has the topic been covered and what are the effects on knowledge about the virus and cervical cancer? *Patient Education and Counseling*, *77*(2), 308–313. https://doi.org/10.1016/j.pec.2009.03.018

Larson, H. J., Cooper, L. Z., Eskola, J., Katz, S. L., & Ratzan, S. (2011). Addressing the vaccine confidence gap. *The Lancet*, *378*(9790), 526–535. https://doi.org/10.1016/S0140-6736(11)60678-8

Margaret Chan. (2011). *WHO director-general calls for change [Internet]*. Geneva: World Health Organization. Retrieved from http://www.who.int/dg/speeches/2011/eb_20110117/en/index.html

Martínez Rubio, M. (2016). Estudio sobre la Enfermedad de Alzheimer en los periódicos El País y El Mundo, desde 2002 a 2006 = Study on the Alzheimer´s disease in the newspapers El País and El Mundo, from 2002 to 2006. *Revista Española de Comunicación En Salud*, *7*(1). https://doi.org/10.20318/recs.2016.3160

Martínez-Martínez, P. J., Tuells, J., & Colmenar-Jarillo, G. (2015). [The late media emergency of smallpox vaccine, news coverage of Spanish press (1999-2004)]. *Revista Espanola De Quimioterapia: Publicacion Oficial De La Sociedad Espanola De Quimioterapia*, *28*(3), 125–131.

McIntosh White, J. (2006). *Source choice in agricultural news coverage: Impacts of reporter specialization and newspaper location, ownership, and circulation.* (Doctoral Thesis). Texas A&M University, USA.

Meyer, S. B., Lu, S. K., Hoffman-Goetz, L., Smale, B., MacDougall, H., & Pearce, A. R. (2016). A Content Analysis of Newspaper Coverage of the Seasonal Flu Vaccine in Ontario, Canada, October 2001 to March 2011. *Journal of Health Communication*, *21*(10), 1088–1097. https://doi.org/10.1080/10810730.2016.1222038

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: an expanded sourcebook* (2. ed., [Nachdr.]). Thousand Oaks, Calif.: Sage.

Penta, M. A., & Baban, A. (2014). Mass media coverage of HPV vaccination in Romania: a content analysis. *Health Education Research*, *29*(6), 977–992. https://doi.org/10.1093/her/cyu027

Perez, S., Fedoruk, C., Shapiro, G. K., & Rosberger, Z. (2016). Giving Boys a Shot: The HPV Vaccine's Portrayal in Canadian Newspapers. *Health Communication*, *31*(12), 1527–1538. https://doi.org/10.1080/10410236.2015.1089466

Quintero Johnson, J., Sionean, C., & Scott, A. M. (2011). Exploring the Presentation of News Information About the HPV Vaccine: A Content Analysis of a Representative Sample of U.S. Newspaper Articles. *Health Communication*, *26*(6), 491–501. https://doi.org/10.1080/10410236.2011.556080

Rappuoli, R., Mandl, C. W., Black, S., & De Gregorio, E. (2011). Vaccines for the twenty-first century society. *Nature Reviews Immunology*, *11*(12), 865–872. https://doi.org/10.1038/nri3085

Riobó, P. (2016). Citas y referencias bibliográficas en publicaciones de salud (Citations and references in health publications). *Revista Española de Comunicación En Salud*, *7*(Sup1). https://doi.org/10.20318/recs.2016.3132

Semetko, H. A., & Valkenburg, P. M. V. (2000). Framing European politics: A Content Analysis of Press and Television News. *Journal of Communication*, *50*(2), 93–109. https://doi.org/10.1111/j.1460-2466.2000.tb02843.x

Sheikh, S., Biundo, E., Courcier, S., Damm, O., Launay, O., Maes, E., … Begg, N. (2018). A report on the status of vaccination in Europe. *Vaccine*, *36*(33), 4979–4992. https://doi.org/10.1016/j.vaccine.2018.06.044

St. John, B., Pitts, M., & Adams Tufts, K. (2010). Disconnects between news framing and parental discourse concerning the state-mandated HPV vaccine: Implications for dialogic health communication and health literacy. *Communication & Medicine*, *7*(1). https://doi.org/10.1558/cam.v7i1.75

Tsuda, K., Yamamoto, K., Leppold, C., Tanimoto, T., Kusumi, E., Komatsu, T., & Kami, M. (2016). Trends of Media Coverage on Human Papillomavirus Vaccination in Japanese Newspapers. *Clinical Infectious Diseases*, *63*(12), 1634–1638. https://doi.org/10.1093/cid/ciw647

Tuells, J., Duro Torrijos, J. L., Chilet Rosell, E., Pastor Villalba, E., Portero Alonso, A., Navarro Ortiz, C., & Galiana de la Villa, E. M. (2013). Noticias sobre el virus del papiloma humano y su vacuna en la prensa valenciana (2006-2011). *Gaceta Sanitaria*, *27*(4), 374–377. https://doi.org/10.1016/j.gaceta.2012.12.014

Turner, N. M., York, D. G., & Petousis-Harris, H. A. (2009). The use and misuse of media headlines: lessons from the MeNZB immunisation campaign. *The New Zealand Medical Journal*, *122*(1291), 22–27.

Weaver, D. A., Lively, E., & Bimber, B. (2009). Searching for a Frame: News Media Tell the Story of Technological Progress, Risk, and Regulation. *Science Communication*, *31*(2), 139–166. https://doi.org/10.1177/1075547009340345

Wendorf Muhamad, J., & Yang, F. (2017). Framing Autism: A Content Analysis of Five Major News Frames in U.S.-Based Newspapers. *Journal of Health Communication*, *22*(3), 190–197. https://doi.org/10.1080/10810730.2016.1256453

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