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### Abstract

Consumers are concerned about the use of antibiotics and hormones in poultry. News media is the primary way consumers gain knowledge about this subject. This study assessed articles in an effort to describe and compare coverage of antibiotic and hormone use in poultry production from The New York Times (NYT) and The Wall Street Journal (WSJ) between 1994 and 2014. Content analysis methodology was used to assess selected articles (N = 265) to identify key messages about antibiotic and hormone use in poultry production, article type, type by year, and complete a comparison of focus, frames, and emergent themes. Five emergent themes were identified: 1) consumers awareness of and concern for antibiotic/hormone use in poultry production (NYT 38.8%, WSJ 51.2%); 2) the role of antibiotic use in poultry production in increased levels of antibiotic-resistant bacteria (NYT 43.8%, WSJ 24.4%); 3) regulation of antibiotic use in poultry production (NYT 35.0%, WSJ 31.7%); 4) purpose of antibiotic/hormone use in poultry production (NYT 32.5%, WSJ 29.3%); and 5) transparency of antibiotic use poultry production practices (NYT 15.0%, WSJ 12.2%). Articles were primarily news stories, and there was an increase in articles focused on antibiotic and hormone use in poultry over the 20-year period. NYT was 8.8 times more likely to write an editorial on one of these topics than was the WSJ. Recommendations include increased understanding and addressing consumer concern about antibiotic and hormone use in poultry production, increased transparency, and improved relations with media contacts who cover poultry production issues.

### Keywords

Agricultural Communications, Content Analysis, National Newspapers, Poultry Production Messaging, Qualitative Research

# RESEARCH

## Poultry Production Messaging in Two National-Circulation Newspapers

Leslie D. Edgar, Donald M. Johnson, and Stuart Estes

### ABSTRACT

Consumers are concerned about the use of antibiotics and hormones in poultry. News media is the primary way consumers gain knowledge about this subject. This study assessed articles in an effort to describe and compare coverage of antibiotic and hormone use in poultry production from The New York Times (NYT) and The Wall Street Journal (WSJ) between 1994 and 2014. Content analysis methodology was used to assess selected articles (N = 265) to identify key messages about antibiotic and hormone use in poultry production, article type, type by year, and complete a comparison of focus, frames, and emergent themes. Five emergent themes were identified: 1) consumers awareness of and concern for antibiotic/hormone use in poultry production (NYT 38.8%, WSJ 51.2%); 2) the role of antibiotic use in poultry production in increased levels of antibiotic-resistant bacteria (NYT 43.8%, WSJ 24.4%); 3) regulation of antibiotic use in poultry production (NYT 35.0%, WSJ 31.7%); 4) purpose of antibiotic/hormone use in poultry production (NYT 32.5%, WSJ 29.3%); and 5) transparency of antibiotic use poultry production practices (NYT 15.0%, WSJ 12.2%). Articles were primarily news stories, and there was an increase in articles focused on antibiotic and hormone use in poultry over the 20-year period. NYT was 8.8 times more likely to write an editorial on one of these topics than was the WSJ. Recommendations include increased understanding and addressing consumer concern about antibiotic and hormone use in poultry production, increased transparency, and improved relations with media contacts who cover poultry production issues.

### KEY WORDS

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### INTRODUCTION

Understanding production of our food is a growing area of concern for the public. One of the greatest areas of consumer concern is the use of antibiotics and hormones in food animal production, including poultry (Brewer & Rojas, 2007; Hwang, Roe, & Teisl, 2005). In the mid-20th century, antibiotic use became prevalent in American agriculture, as researchers began to understand the economic implications of including small amounts of antibiotics in the feed of livestock (Gustafson & Bowen, 1997). In contrast to the use of antibiotics in the three major livestock sectors (beef, swine, and poultry), hormones are only used in the beef industry and are not permitted for use in the pork and poultry industries (American Meat Institute [AMI], 2009). Antibiotics play an important role in poultry production, helping to treat illnesses in a therapeutic fashion and improving the size and quality of poultry in a growth-promoting capacity (Singer & Hofacre, 2006). Consumer perceptions of poultry as a quality food source are important to understand because poultry production is an important part of the agricultural landscape of the U.S. (Poultry Federation, 2014; United States Department of Agriculture [USDA], 2014).

Consumers gather much of their understanding of the food production system from media (Malone, Boyd, & Bero, 2000). Agriculture is not heavily covered in the media, but media coverage of agricultural issues still plays a role in influencing the public's perceptions and voting choices, which ultimately affects legislation (Kuykendall, 2010). Newspapers play an important role in informing the public about agriculture (Reisner, 2005). Information disseminated by newspapers inherently reflects the views of the journalists and editors who write and determine content for the outlet (Reisner, 2005). The way journalists and editors interpret and view a story is the way it is presented to the public in the newspaper (Reisner, 2005). The importance of newspapers in communicating agricultural material makes newspapers articles an appropriate context to study messaging about antibiotics and hormones (Reisner, 2005). A better understanding will lead to recommendations for agricultural communicators who struggle with a public that does not adequately understand the poultry production processes that provide consumers with an inexpensive source of protein (Poultry Federation, 2014).

## **THEORETICAL FRAMEWORK AND LITERATURE REVIEW**

### **Agenda Setting**

In research McCombs and Shaw (1972) conducted about the role of mass media in political campaigns, an important distinction is made concerning media effects on how the public learns; namely, the public learns more about the issues on which the media places the most emphasis. This ability of the media to set the pace and emphasis for what the public knows about an issue is known as the agenda-setting function of media (McCombs & Shaw, 1972). This research suggests that individual news media outlets paint an imperfect picture of the actual climate surrounding an issue, but the composite of many media outlets often has an agenda-setting function on media consumers. The effect of agenda setting is prominent especially in regard to influencing which issues the public views as salient (i.e. accessible) (Scheufele & Tewksbury, 2007). Agenda setting is not so much focused on what the issue is about, but more so on the amount of time and attention given to the issue, which carries a more potent effect with the audience (Scheufele & Tewksbury, 2007).

Agenda setting could well be the basis of the business model for newspapers. An important concept to note is the primary concept behind newspapers, namely, to produce readers, not news (Conboy & Steel, 2008). By focusing efforts on tailoring news to meet an audience, newspapers can more effectively generate revenue and/or exert influence over readers (Conboy & Steel, 2008). Through engaging in agenda setting, newspapers cater to what they think their audience will want to hear, thus generating readers.

Previous research has used agenda setting to describe the effect of media on consumer understanding and confidence, and has noted a negative impact on consumer confidence in the preparedness of the food system to deal with food safety events (Bharad, Harrison, Kinsey, Degeneffe, & Ferreira., 2010). Furthermore, an increase in mass media coverage of food safety issues is enough to lead to a decline in consumer confidence and an increase in the belief that the national food supply system is not prepared to deal with any problems that would arise (Bharad et al., 2010). Research results point to the mass media's role as an influential and important component of changing consumer attitudes (Bharad et al., 2010).

### **Framing**

Framing is a way of understanding how an issue is characterized in media and affects how the public views the issue (Scheufele & Tewksbury, 2007). It is based on the assumption that characterization of an issue in a news report can have an influence on how an audience understands it. Framing is used by journalists to "present information in a way that resonates with existing underlying schemas among their audiences," which does not necessarily mean that journalists intentionally spin news stories in a certain way or try to deceive their audiences (Scheufele & Tewksbury, 2007, p.12). Essentially, framing is a valuable tool for presenting complex issues to audience members so they can understand them based on the schema and constructs they already possess (Scheufele & Tewksbury, 2007).

Valkenburg, Semetko, and Vreese (1999) identified four common article frames. The *conflict* frame highlights the tension between individuals, groups, or institutions. The *human interest* frame brings an individual's perspective or emotional angle to the presentation of an event, issue, or problem. The *responsibility* frame presents an issue in such a way as to attribute responsibility, positively or negatively, to a group, organization, or institution. Lastly, the *economic consequences* frame focuses on how an individual, group, organization, country, or region will be affected economically by an issue or event.

The issue of antibiotic and hormone use is especially salient in the poultry industry, where, like other agricultural sectors, consumer opinions affect - purchasing behavior (Brewer & Rojas, 2007; Hwang et al., 2005; USDA, 2014). Often, what consumers do know about agricultural processes they primarily glean from media (Malone et al., 2000; Reisner, 2005), and newspapers are a form of media readily available to communities from which they learn about agricultural practices in their area and across the country (Reisner, 2005; Reisner & Walter, 1994). Newspapers, as well as other media outlets, often provide information about issues through the lenses of agenda-setting and framing (McCombs & Shaw, 1972; Scheufele & Tewksbury, 2007). The way journalists portray agricultural issues may be based more on their understanding of how to make the story into an article than on their understanding of an agricultural practice (Reisner, 2005). Consumers are now more removed from the farm than ever because of urbanization and technology (Leising, Pense, & Igo, 2000), thus they are more willing to accept a journalist's account of an agricultural issue as expert opinion because of their lack of understanding.

Newspaper articles are subject to agenda setting theory and framing theory, which are a media outlet's ability to tell readers *what* are the salient issues and *how* to think about those issues, respectively (McCombs & Shaw, 1972; Scheufele & Tewksbury, 2007). Because the public (consumers) gains most of its knowledge of the use of antibiotics and hormones in the poultry industry from media (Kuykendall, 2010; Panach, 2007), there is a need to examine the messaging to identify and determine the extent of agenda setting and framing present, both of which have the potential to change consumer behavior by influencing what consumers think about and how they think about it.

In addition to informing their own readers, national circulation newspapers often set the agenda for national television and regional and local newspaper coverage of agricultural issues (Denham, 2014). The importance of newspapers in communicating agricultural material and in setting the media agenda makes national newspapers an appropriate context in which to study messaging about antibiotics and hormones (Reisner, 2005). A better understanding will lead to recommendations for agricultural communicators who struggle with a public who does not adequately understand the poultry production processes that provide consumers with an inexpensive source of protein (Entman, 1989; Poultry Federation, 2014).

## PURPOSE AND RESEARCH OBJECTIVES

The purpose of this study was to compare coverage of antibiotic and hormone use in poultry production in two major national-circulation newspapers, The New York Times and The Wall Street Journal, between 1994 and 2014. Specific objectives were to:

1. Describe and compare the types of articles (news, feature, or editorial) about antibiotic and hormone use in poultry production appearing in the NYT and the WSJ between 1994 and 2014;
2. Describe and compare the focus (antibiotics, hormones, or both antibiotics and hormones) of articles about antibiotic and hormone use in poultry production appearing in the NYT and WSJ between 1994 and 2014;
3. Describe and compare the frames used in articles about antibiotic and hormone use in poultry production appearing in the NYT and WSJ between 1994 and 2014; and
4. Identify and compare emergent themes in articles about antibiotic and hormone use in poultry production appearing in the NYT and WSJ between 1994 and 2014.

## METHODS

This study utilized content analysis to objectively, systematically, and quantitatively describe the overall content of communication. Weber (1990) defined content analysis as a research method that utilizes a set of procedures to make valid inferences from text, and the inferences drawn from content analysis can be about the sender(s) of the message, the message itself, or the audience. The data analyzed were the text of two national newspapers' print stories pertaining to antibiotic and hormone use in poultry production.

The population of articles for this study included news articles, feature stories, and editorial/opinion pieces from the selected national newspapers: *The New York Times* and *The Wall Street Journal*. These newspapers were selected based on their reach and readership, specifically being the two largest-circulation (combined digital and print subscriptions) national newspapers (Pew Research Center, 2013). Only full-length articles were analyzed, and articles written earlier than 1994 were not included in this study. This 20-year time span was selected because it was thought adequate to identify trends in media coverage, changes in poultry production antibiotic/hormone use methods, and increases in consumer concern about food production processes (Brewer & Rojas, 2007; Gustafson & Bowen, 1997).

The population for these newspapers was determined by searching Lexis Nexis Academic (New York Times) and ProQuest (Wall Street Journal) using the search phrase "antibiotic! OR hormone! w/5 chicken OR poultry" for Lexis Nexis and the search phrase "(antibiotic OR hormone) NEAR/5 (chicken OR poultry)" for ProQuest. Using these search terms narrowed findings to articles with the words "antibiotics" or "hormones" within five words of the words "chicken" or "poultry". The initial population searches were completed on 9 January 2015, and returned 265 articles. A sample size of 124 articles was calculated as being sufficient to achieve a 95% confidence level and a 5% confidence interval (Creative Research Systems, 2012).

The sample size for each newspaper was determined based on each newspaper's proportion of total articles in the population. Thus, 68% ( $n = 99$ ) of the articles were from *The New York Times*; and 32% ( $n = 47$ ) were from *The Wall Street Journal*. Articles were further stratified by year based on the percentage each year contributed to the population of articles. To ensure that a random selection was made, the article titles and year of publication for the entire population of articles were input into a Microsoft Excel spreadsheet, and the randomization function was used to assign each article a random number. The articles were then filtered in ascending order by year and randomization number using the filter function in Excel, and the specified frequency for each year was chosen from the filtered list. To acquire and store articles, the researcher downloaded and saved electronic versions (Microsoft Word) of the selected articles from Lexis Nexis and ProQuest.

During data collection, it became apparent that some articles fit the search criteria but, when analyzed more closely, did not fit the context or scope of the research. It was not possible to narrow the search terms any further and attain a more precise population, so each article was examined by the researchers to determine if the article met the required study criteria; (1) the article was a true journalistic article (i.e., not a news brief); (2) the article specifically fit within the context of poultry production and/or (3) the article related to poultry production in a broad sense. Twenty-two articles did not meet one or more of these criteria and were deleted from the sample, leaving 124 articles for further analysis.

To guide the content analysis used in this research, as well as to maintain consistency in evaluation, a code sheet was developed by the researchers. The first question of the code sheet assesses the type of article being analyzed, namely, whether the article was a news, feature, or editorial piece. The type of article was determined based on characteristics of the writing. News stories were characterized as such when they followed the inverted pyramid format and were focused on timely, newsworthy topics. Feature stories were named as such when written using block format and were focused on human interest or entertaining aspects of a situation. Editorial pieces were characterized as such when they were letters to the editor or opinion pieces.

The second question was created to assess the frame of the article, namely, conflict, economic consequences, human interest, responsibility, or inconclusive/multiple (Valkenburg et al., 1999). Article frame was determined by matching the

article to the best definition of the four frames noted by Valkenburg and colleagues (1997). If an article exhibited more than one frame it was labeled multiple, and if a frame was not exhibited the article was labeled inconclusive. The third question assessed whether the article focused on antibiotics, hormones, or both.

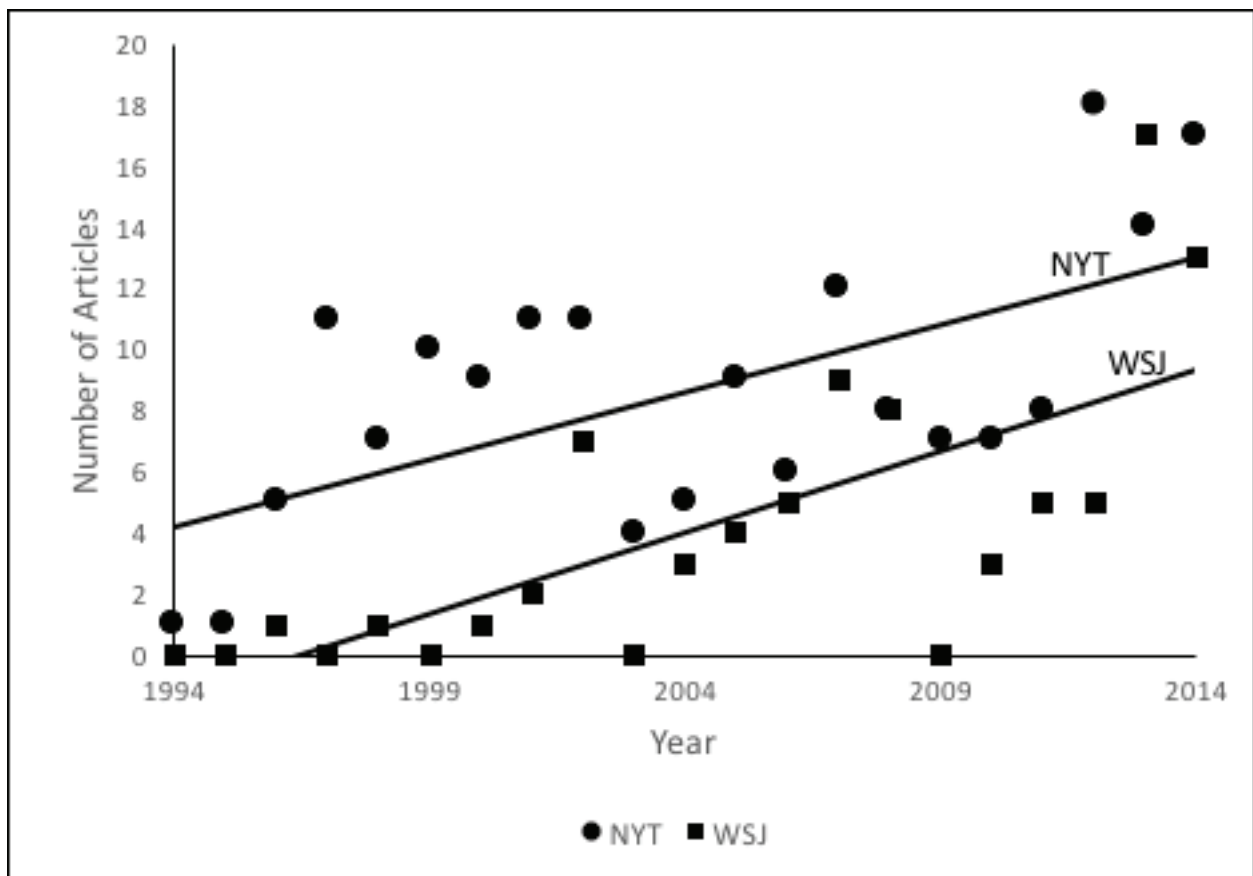
Prior to data analysis inter- and intra-coder reliability was addressed. To ensure inter-coder reliability the lead researcher and the researcher's committee chair selected five articles from the population and analyzed each of the articles separately. After both coders had completed coding one article, percent agreement was calculated using hand calculations, and the coders compared analyses and reconciled differences through negotiating (Weber, 1990). This was repeated for each article until all five had been analyzed. Typically, an agreement level of 80% is acceptable for inter-coder reliability (McMillan & Schumacher, 2010), and in this instance the two coders' agreement level was between 83.3% and 98.1% when coding the five articles together. Because the lead researcher and committee chair calculated agreement levels greater than 80% on the five articles, the lead researcher completed the coding singlehandedly. Intra-coder reliability was accounted for by the creation and use of a code sheet during analysis, which ensured coding was conducted similarly for each article. To ensure validity for the qualitative portion of this content analysis, the researcher engaged in prolonged and persistent field work, reported findings with low-inference descriptors, and sought agreement on emergent themes present with the committee chair prior to reporting findings. The use of code sheets to analyze the articles also serves as an audit trail of the research.

The content analysis methodology used in this research incorporated both quantitative and qualitative components. Quantitative data was gathered and analyzed for article type, article focus, and article frame; these constructs were analyzed for frequencies using Microsoft Excel.

The qualitative portion of this research dealt with categorizing emergent themes gathered regarding key messaging about antibiotic/hormone use in poultry production. Using keywords in context (KWIC) analysis, the researcher analyzed each article to determine messaging about antibiotic/hormone use in poultry production, which were reported as short phrases on the code sheet (Weber, 1990). Additionally, the researcher used the comments feature in Microsoft Word to highlight keywords and phrases that supported the messaging derived from the article. The phrases entered into the code sheet for each article were input into an Excel spreadsheet. Utilizing the spreadsheet and following the constant comparative method (Lincoln & Guba, 1985), similar phrases used to describe messaging about antibiotic/hormone use in poultry production were grouped together as emergent themes. The occurrences of each of these themes were then reported as frequencies.

## RESULTS

Between 1994 and 2014, the NYT and WSJ published 265 articles on the topic of antibiotic and hormone use in poultry production; 68.3% ( $n = 181$ ) of these appeared in the NYT, while 31.8% ( $n = 84$ ) appeared in the WSJ. Regression analyses indicated a significant increase by year in the number of articles published in both the NYT [ $F(1, 19) = 11.45$ ,  $p < .01$ ,  $R^2 = .38$ ] and the WSJ [ $F(1, 19) = 19.60$ ,  $p < .001$ ,  $R^2 = .51$ ]. Both regression coefficients were statistically significant ( $p < .05$ ) and indicated an increase of 0.44 articles per year for the NYT and an increase of 0.53 articles per year for the WSJ. Figure 1 displays the trend in number of articles about antibiotic and hormone use in poultry production by year in the NYT and WSJ. A proportional stratified (by year) random sample of articles was selected from the NYT ( $n = 80$ , 66.1%) and the WSJ ( $n = 44$ , 33.9%) for further analyses.



**Figure 1.**

*Trends in Articles per Year about Antibiotic and Hormone Use in Poultry Production Published in the NYT and WSJ, 1994-2014.*

In both NYT and WSJ, news articles made up a majority of the articles published, followed by feature articles, and editorials (Table 1). Chi square analyses revealed an overall significant association between and the percentage of news, feature, and editorials published in each newspaper,  $\chi^2(2) = 7.61, p = .02$ . The *Cramer's V* of .25 indicated the magnitude of this association was moderate (Rea & Parker, 1992).

Examination of the squared Pearson residuals (Sharpe, 2015) suggested differences between newspapers in the frequency of editorials was the primary factor contributing to the overall association between newspaper and article type, with NYT publishing 17 and WSJ publishing one. A second chi square test comparing the frequency of editorials in the two newspapers, following procedures described by Sharpe (2015) and using an adjusted alpha level of .025, confirmed a significant association between newspapers and the frequency of editorials about antibiotic and hormone use in poultry production,  $\chi^2(1) = 7.57, p = .01$ . The percentage of editorials was 8.8 times greater in the NYT as compared to the WSJ.



**Table 1**

*Comparison of Types of Articles about Antibiotic and Hormone Use in Poultry Production in the NYT and WSJ, 1994-2014*

Type of article	New York Times		Wall Street Journal	
	<i>f</i>	%	<i>f</i>	%
News	43	53.8	28	68.3
Feature	20	25.0	12	29.3
Editorial	17	21.2	1	2.4

$\chi^2(2) = 7.61, p = .02, \text{Cramer's } V = .25.$

The focus of a majority of articles in both the NYT and WSJ was antibiotics only; the second most common focus was both antibiotics and hormones for the NYT and hormones only for the WSJ (Table 2). The association between newspaper and article focus was significant,  $\chi^2(2) = 8.60, p = .01$ . The *Cramer's V* of .27 indicated a moderate association between newspaper and article type (Rea & Parker, 1992).

The squared Pearson residuals suggested differences in the percentages of articles focusing on hormones only and on both antibiotics and hormones were the primary factors contributing to the overall association between newspaper and article focus. This was confirmed by the results of the *Fisher's exact test* ( $p = .01$ ). The NYT was approximately 8.3 times more likely to focus articles on both antibiotics and hormones, while the WSJ was 7.9 times more likely to focus on hormones only.

**Table 2**

*Comparison of Focus of Articles about Antibiotic and Hormone Use in Poultry Production in the NYT and WSJ, 1994-2014*

Focus of article	New York Times		Wall Street Journal	
	<i>f</i>	%	<i>f</i>	%
Antibiotics only	61	76.3	28	68.3
Hormones only	3	3.7	12	29.3
Both antibiotics and hormones	16	20.0	1	2.4

$\chi^2(2) = 8.60, p = .01, \text{Cramer's } V = .27.$

NYT used the human interest frame most often (30.0 %) and the economic consequences frame least often (5.0%). WSJ most often used the economic consequences frame (29.3%) while least often using multiple frames (4.8%) (Table 3). Twenty percent of NYT articles employed multiple frames compared to only 4.8% for the WSJ. Articles with frames that could not be categorized were labeled as "inconclusive" and constituted 5.0% and 4.8% of all articles in the NYT and WSJ, respectively. Chi square analysis revealed a significant association between newspaper and the article frames used.  $\chi^2(5) = 20.01, p = .00$ . The *Cramer's V* of .41 indicated a relatively strong association between newspaper and article framing (Rea & Parker, 1992).

The magnitude of the squared Pearson residuals suggested the difference in frequency of use of the economic consequences frame was the primary contributor to the overall association between newspaper and frame use. This was confirmed by the chi square test results,  $\chi^2(1) = 13.91, p = .00$ . WSJ used the economic consequences frame 5.9 times more frequently than did NYT.

**Table 3**

*Comparison of Frames Used in Articles about Antibiotic and Hormone Use in Poultry Production the NYT and WSJ, 1994-2014*

Type of article	New York Times		Wall Street Journal	
	f	%	f	%
Conflict	12	15.0	10	24.4
Economic consequences	4	5.0	12	29.3
Human interest	24	30.0	10	24.4
Responsibility	20	25.0	5	12.2
Inconclusive	4	5.0	2	4.8
Multiple	16	20.0	2	4.8

$\chi^2(5) = 20.01, p = .00, \text{Cramer's } V = .44$ .

Five emergent themes were identified based on article analysis, and the majority of articles contained at least one, if not more, of these themes. Those emergent themes were: 1) *consumers' awareness of and concern for antibiotic/hormone use in poultry production*; 2) *the role of antibiotic use in poultry production in increased levels of antibiotic-resistant bacteria*; 3) *regulation of antibiotic use in poultry production*; 4) *purpose of antibiotic/hormone use in poultry production*; and 5) *transparency of antibiotic use poultry production practices*. Table 4 contains a list of keywords denoted in each emergent theme area.

**Table 4**

*Keywords from Emergent Themes in Articles about Antibiotic and Hormone Use in Poultry Production the NYT and WSJ, 1994-2014*

Emergent theme	Keywords
Consumer concern	antibiotic-free, consumers, consumer demand, cuisine, hormone-free, increased demand
Antibiotic resistance	antibiotic-resistant, bacteria, fluoroquinolones, human diseases/ illnesses, immune, nontherapeutic use
Regulation	banning, Food and Drug Administration, government
Purpose of use	nontherapeutic, promote growth, treat or prevent disease
Transparency of use	estimates, monitor, reluctant, skeptical

Antibiotic resistance, at 38.8% of articles, was the most frequently identified emergent theme in NYT articles; consumer concern (51.2%) was the most frequently identified emergent theme in WSJ articles. Transparency of use was the least frequently identified emergent theme in both NYT (15.0%) and WSJ (12.2%) (Table 5). The results of chi square analysis indicated there was not a significant association between newspaper and the frequency of use of the five identified emergent themes,  $\chi^2(4) = 3.72, p = .44$ .

**Table 5**

*Comparison of Emergent Themes in Articles about Antibiotic and Hormone Use in Poultry Production the NYT and WSJ, 1994-2014*

Type of article	New York Times		Wall Street Journal	
	<i>f</i>	%	<i>f</i>	%
Consumer concern	31	38.8	21	51.2
Antibiotic resistance	35	43.8	10	24.4
Regulation	28	35.0	13	31.7
Purpose of use	26	32.5	12	29.3
Transparency of use	12	15.0	5	12.2

$\chi^2(4) = 3.72, p = .44, \text{Cramer's } V = .14$ .

## SUMMARY AND CONCLUSIONS

This study noted an increase in articles focused on poultry antibiotics or hormones and the articles were primarily news stories (NYT 53.8% and WSJ 68.3%). Further analysis noted a significant association between the percentage of news, features, and editorial articles. This moderate magnitude of association was due to the large variability in editorials published by outlet (NYT: 17 and WSJ: 1). *The New York Times* was 8.8 times more likely to print editorials focused on poultry antibiotics or hormones compared to *The Wall Street Journal*. Whereas, the WSJ was 7.9 times more likely to write a story focused on hormones only. Since editorials are opinion-based pieces it is important for the poultry industry and agricultural communicators to work with journalists writing these articles to ensure they are knowledgeable on these subject areas.

The most prevalent frame used in the articles assessed was the human interest frame for NYT (30%) and economic consequences for WSJ (29.3%). Framing is used by journalists to construct messages. Scheufele and Tewksbury (2007) discussed framing as the basis for the way media outlets cause readers to define *how* they think about topics, such as antibiotic and hormone use in poultry production. With this in mind, these outlets represented human interest and the economic consequences frames, meaning they influenced readers to think about antibiotic or hormone use in poultry production through an emotional or financial perspective (Valkenburg et al., 1997). The second most prevalent frames were responsibility in NYT (25%) and conflict and human interest in WSJ (24.4%, respectively). The responsibility framed articles attributed responsibility to a group, organization, or institution, thus leading readers to think that antibiotic and hormone use in poultry production—and the issues surrounding it—are the responsibility of one of the groups represented in the articles (Valkenburg et al., 1997). While articles identified in the conflict frame led readers to see the tension between groups, which in the case of this research were consumers, government, integrators, non-agricultural groups, and poultry producers (Valkenburg et al., 1997). Collectively, the characterization of these three frames in over half of the articles analyzed influence readers to understand that antibiotic and hormone use in poultry production is an issue that should be viewed emotionally, with responsibility for issues attributed to one or more groups, who may or may not be in conflict with each other (Scheufele & Tewksbury, 2007). These frames represent underlying schemas held by

the audiences that journalists use to present information so that it easily resonates with readers (Scheufele & Tewksbury, 2007). Considering newspapers need to generate readership, the inclusion and spread of these frames represent the media outlets' efforts to reach diversified audience members (Conboy & Steel, 2008). However, these frames will have an impact on readers so it is important to ensure that the information being presented is accurate.

Although the analysis did not identify a significant association between newspaper and frequency of emergent theme, the themes are important. The first emergent theme, *consumer awareness of and concern for antibiotic/hormone use in poultry production* (NYT 38.8%, WSJ 51.2%), coincides with previous research, which shows that consumers were concerned about the use of antibiotics and hormones in food production (Hwang et al., 2005). With the idea that newspapers focus on producing readers, not necessarily news, as their business model (Conboy & Steel, 2008), the fact *consumer concern* was a prevalent theme is understandable. As the research by Hwang and colleagues (2005) demonstrated, consumers are aware of and concerned with the use of antibiotics and hormones in poultry production and *The New York Times* and *The Wall Street Journal* tailored articles to this audience. Focusing on what is important to the reader enables media outlets to exert an agenda-setting function (McCombs & Shaw, 1972; Scheufele & Tewksbury, 2007), which coincides with previous research that perpetuates a lack of consumer confidence in the U.S. poultry industry (Bharad et al., 2010). Furthermore, these media outlets chose to increasingly cover antibiotic and hormone use in poultry production in a way that evoked a consumer awareness theme was likely enough to decrease consumer confidence in the poultry industry based strictly on frequency of media coverage of this issue (Bharad et al., 2010).

The second emergent theme revealed was the *role of antibiotic use in poultry production in increased levels of antibiotic-resistant bacteria*. As Gustafson and Bowen (1997) noted, the general public is mostly concerned with the question of whether or not antibiotic use in poultry production contributes to increased antibiotic-resistant bacteria that could affect humans. Again, the emphasis the media outlets placed on this theme, due to its importance to readers, points to their agenda-setting power (McCombs & Shaw, 1972). While the emphasis of this theme informed readers *what* to think about, the fact that these articles pointed toward nontherapeutic uses (i.e. growth-promotant) as the primary cause for increased antibiotic-resistant bacteria informed the readers *how* to think about this issue. This theme also highlighted the conflict between agricultural and non-agricultural measures of the quantity of antibiotics used in poultry production, which served to exacerbate the distrust in poultry production methods readers incurred from reading the articles (Bharad et al., 2010). The fact that articles with this theme referenced both agricultural and non-agricultural research about this issue likely leaves readers unsure of how to evaluate implications of the science and of what the best course of action is based on the results (Malone et al., 2000).

The third emergent theme that represented key messaging was *regulation of antibiotic use in poultry production*. Research conducted by Kuykendall (2010) noted the media's ability to affect not only the general public's conception of agriculture but the specific legislation surrounding the issue. The presence of this theme, which emphasized the need for regulation of antibiotic use in poultry production, sets an agenda for readers to consider the implementation of these stricter regulations (McCombs & Shaw, 1972). The effects of this agenda-setting function can be seen in the articles over the course of time analyzed, as this theme's context evolved from calling for stricter regulation to referencing legislation or government oversight banning the use of an antibiotic in poultry production in 2005.

The fourth emergent theme was *purpose of antibiotic/hormone use in poultry production*. This theme highlighted the media outlets' agenda-setting capacity to inform readers of the use of antibiotics and hormones in poultry production; by placing emphasis on this issue the articles increased consumer distrust in the purpose of antibiotic use in poultry production (Scheufele & Tewksbury, 2007). Hormones were represented in this theme less frequently than antibiotics, but conflicting information was presented in articles in this thematic area regarding hormones as some articles cited the illegality of their use (USDA, 2014) and others pointed to the higher quality of hormone-free poultry. The antibiotics portion of this theme was conflicting as well, either noting the purpose as therapeutic only, nontherapeutic only, or a combination of both. The portrayal, and thus framing, of the purpose of antibiotic use was dependent largely on the context of the article and what the journalist understood to be the most important aspects of the situation (Reisner, 2005).

The fifth emergent theme was *transparency of antibiotic use in poultry production practices*. These media outlets lacked consistent data representing actual antibiotic use in poultry production. The presence of this agenda fuels consumer distrust of agricultural practices (Scheufele & Tewksbury, 2007), but more importantly it has the potential to create reader distrust since non-agricultural groups pointed to higher estimates of the amount of antibiotics used in poultry production. As a part of this theme, poultry producers were held directly responsible for the lack of transparency, which could be attributed to the lack of complete and adequate coverage of this issue (Reisner & Walter, 1994). This lack of complete and adequate coverage is exacerbated by lack of research and lack of transparency from producers, which were both exemplified in articles with this emergent theme.

## RECOMMENDATIONS

The general public gains most of its understanding of agriculture from news media (Malone et al., 2000), and agricultural communicators are uniquely equipped to inform the public about these issues. The data and conclusions outline a need for improved agricultural communications practices including a deeper understanding of consumer concerns and awareness, increased transparency in coverage of the antibiotic and hormone use practices of poultry producers, and stronger relationships with communicators outside of agriculture. Recommendations for public relations in the poultry industry include increased transparency surrounding the subjects of the purpose of antibiotic and hormone use in poultry production, especially since hormones have not been used for decades. Additionally, the poultry industry and agricultural communicators should play a more integral role in helping consumers to understand antibiotic use in poultry production and the increased levels of antibiotic-resistant bacteria and improved relations with media sources outside of agriculture. This should come via improved relations with media contacts who cover poultry production issues. Recommendations can be made for journalists outside of agriculture; namely, to improve their knowledge of the poultry industry and provide them with credible scientists who can serve as sources for accurate information when writing their stories. It is also important for NYT and WSJ journalists who write about antibiotic and hormone use in poultry production to develop stronger relationships with poultry industry contacts.

Based on the findings and conclusions, future research should focus on gaining deeper understanding of how journalists and gatekeepers set agendas and frame articles about antibiotic and hormone use in poultry production, determining best practices to increase agricultural entities' relations with media outside of agriculture, and examining the relationship between the agenda-setting function regarding antibiotic and hormone use in poultry production and consumer behavior. Additionally, research outside the field of agricultural communications should delve deeper into understanding the link between antibiotic use in poultry production and increased levels of antibiotic-resistant bacteria. First, qualitative research in the form of focus groups or interviews should be conducted to understand how journalists and gatekeepers decide on what agenda will be set about antibiotic and hormone use in poultry production and how those articles will be framed. Also, agricultural communicators and public relations personnel in the poultry industry should build relationships with media outside of agriculture, and future research should focus on the best ways for this to be accomplished. With a focus on the theory of agenda-setting, experimental research designs could assess effect antibiotic and hormone use in poultry production have on consumer behavior when purchasing poultry. Finally, this study pointed to the need for research to further clarify the contribution of antibiotic use in poultry production to increased levels of antibiotic-resistant bacteria, and this should be a focus of research for poultry scientists; more revealing data about this subject could help future efforts to improve transparency in the poultry industry.

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