

Scientific quality of news published in the lay press about the discovery of the first synthetic chemotherapeutic drug

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INTRODUCTION

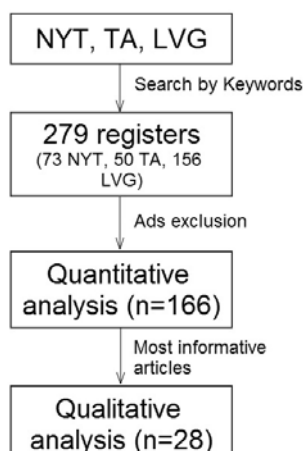
We are interested in evaluating the scientific dissemination of the main drug discoveries during the 20th century.

Although extensive research has focused on the quality of scientific articles referring to those discoveries, rigorous data on the quality of news reports in the lay press are lacking.

In this study, we analyzed the impact in the lay press of the discovery of arsphenamine (Salvarsan) to treat syphilis in the early 20th century. Additionally, we evaluated the scientific quality of the news articles about this discovery.

METHODS

Figure 1. Flow chart of the study.



- **Newspaper databases:** The New York Times (NYT), The Times (TA), and *La Vanguardia* (LVG).
- **Search criteria:** keywords: arsphenamine, salvarsan, 606, Ehrlich, 914, and syphilis; publication date: 1908 - 1949.
- **Quantitative analysis:** reading, categorization, and description of the articles.
- **Qualitative analysis:** evaluation of the scientific quality by 4 reviewers using Oxman's index (scores from 1 (minimum) to 5 (maximum)).

Table 1. Main indexes for evaluating scientific quality.

Author (Year)	Source (Impact Factor)	No. of items (Range)	Validation (Reviewers/Articles)
Oxman (1993)	J Clin Epidemiol (5.33)	8 (0 → 5)	Yes (6 / 5-15)
Biondo (2005)	Biomédica (0.32)	9 (0 → 5)	Yes (2 / 129)
laboli (2010)	PLOS ONE (3.73)	6	No
Robinson (2013)	Public Health (1.35)	21 (-1 → +1)	No

RESULTS

QUANTITATIVE ANALYSIS

Figure 2. Number of articles (n=166) by year of publication and newspaper.

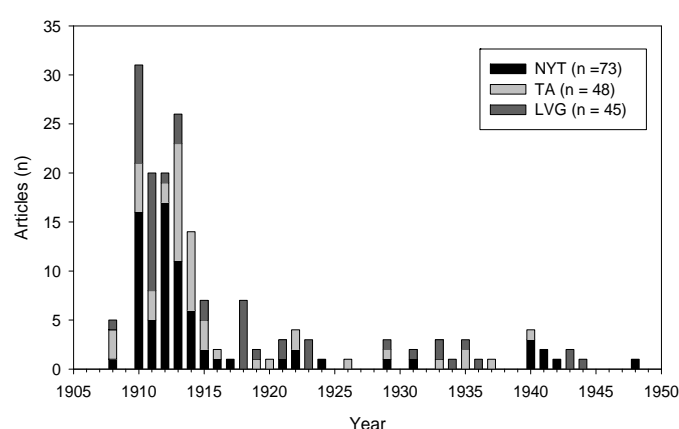
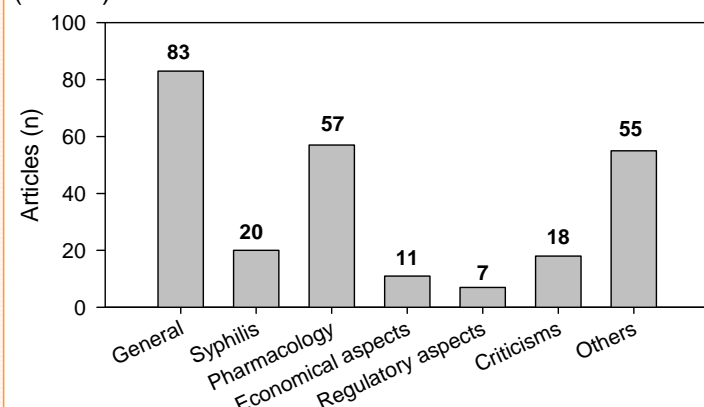
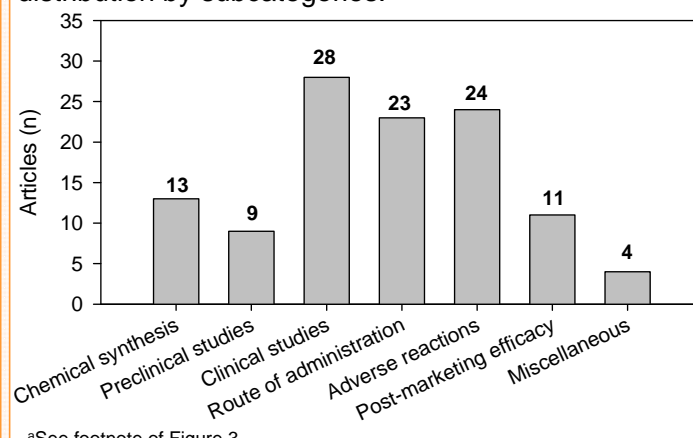


Figure 3. Article content distribution by main categories (n=166).^a



^aThe total number of articles classified in the different categories is higher than the initial number of articles because some were classified in many categories.

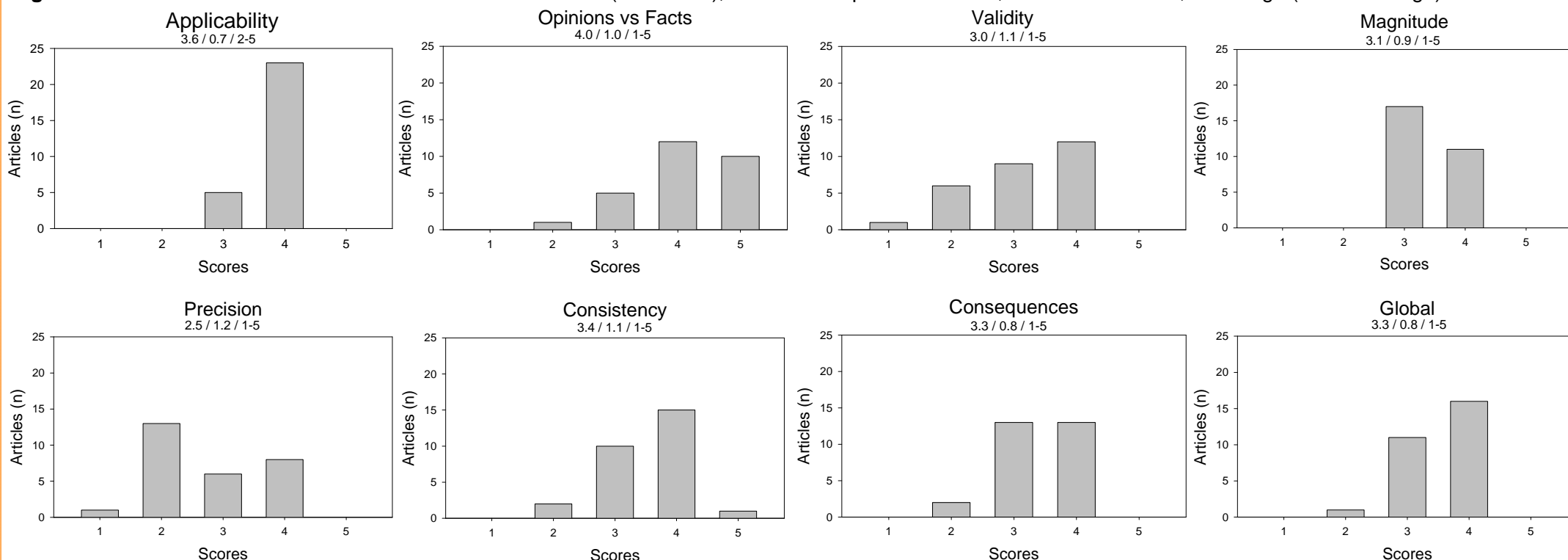
Figure 4. Articles on pharmacology (n=57): distribution by subcategories.^a



^aSee footnote of Figure 3.

QUALITATIVE ANALYSIS

Figure 5. Distribution of scores for the 8 items in Oxman's index (28 articles); scores are reported as mean, standard deviation, and range (\bar{x} / SD / range).



CONCLUSIONS

- Between 1910 and 1915 the discovery of arsphenamine was widely disseminated through the international press, contributing to the popularization of Salvarsan and Paul Ehrlich.
- Most articles included "general aspects" and "pharmacology" topics on arsphenamine; most articles including "pharmacology" topics referred to clinical studies.
- The Oxman index has revealed the high quality of a significant number of news items that reported the discovery of arsphenamine.
- The low percentage of reports fulfilling our criteria for completeness and the low scores for "Precision" may be related to the period evaluated; the results might change when later periods in the 20th century are analyzed.

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Background

There has been extensive research into the quality of scientific articles, but rigorous data on the quality of news reports disclosing scientific findings are lacking. We present here the initial results of a three-part study currently in-progress to evaluate the quality of the news reports of three different medical discoveries at three different periods in the 20th Century. The impact of the discovery of arsphenamine (Salvarsan®) to treat syphilis in the early nineteen hundreds will be analyzed here.

Methods

We searched for all the documents about arsphenamine and its derivatives published in *The New York Times* (NYT), *The Times* (TA) and *La Vanguardia* (LVG), from New York, London and Barcelona, respectively. The terms arsphenamine, salvarsan, 606, 914, Ehrlich, and syphilis, were used in the search of newspapers' online libraries. We filtered the news found based on the degree of detail they contained. We then evaluated the most informative articles using the index described by Oxman et al. (1993) which has eight subsets and a scale between 1 (minimum) and 5 (maximum quality).

Results

We obtained 279 documents, of which 28 (10%) fulfilled our criteria of being informative (NYT n=12, TA n=11 and LVG n=5). The "global quality" of these was rated with a mean score of 3.4 (SD=0.7; range 1-5). When taking into account the specific quality measures of the Oxman index, "opinions vs. facts" and "applicability" obtained the highest scores (mean=4.1, SD=1.0, range 1-5; and 4.0, 1.0, 2-5, respectively), while "precision" scored the lowest (2.4, 1.2, 1-5). The rest of the parameters ("validity", "magnitude", "consistency", and "consequences") recorded mean scores between 2.9 and 3.4.

Conclusions

The Oxman index has revealed the high quality of a significant number of news items that reported the discovery of arsphenamine. It is tempting to speculate that the reduced percentage of reports fulfilling our criteria of completeness, as well as the low "Precision" scores, may be due to the period being evaluated and that the results might change when later periods in the 20th Century are analyzed.

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