Oncologists’ Reluctance to Use the Terms Hope and Cure: A Bibliometric Analysis of Articles from Two High-Impact Oncology Journals

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The words “cure” and “hope” are important terms in oncology, reflecting a balance of aspirations and realism for physicians and patients. Yet, some have suggested that oncologists are reluctant to use these terms. We tested this hypothesis by performing a bibliometric analysis of the frequency of use of these words in JAMA Oncology (JAMAoncol) and the Journal of Clinical Oncology (JCO). The text of all articles in three categories—primary research, editorials, and narrative essays—appearing in JCO from 2000-2018 and in JAMAoncol from 2015-2019 were analyzed. These analyses compared, across these categories, the proportion of articles containing the words “cure” and “hope,” as well as the proportion of total sentences containing these words. Results were similar for both journals, with minor exceptions. Both “hope” and “cure” were used in a greater number of articles and sentences in the narrative and editorial categories than in primary research. Moreover, “hope” was used more often in narrative essays than in editorials. There are statistically significant differences in frequency of the use of the terms “cure” and “hope” as a function of the type of article published in the JCO and JAMA Oncology (two-sided p-values ranging from .005 to <.001). The relative reluctance to use these terms in more scientifically-oriented original reports, despite concomitant improvements in oncologic outcomes, may reflect a bias worthy of future exploration.
During a 2018 keynote address\(^1\) to the American Society of Clinical Oncology (ASCO), Dr. Norman Sharpless (director of the NCI) observed, “An overarching worry of today’s oncologist has been the management of expectations. We don’t want to overpromise and give hope that is false… I think we have become scared to tell patients that we actually hope to cure them, and it may be time to examine how we communicate our efforts in this area.” We realize that it is rational – if not ethical – for physicians to avoid exaggerating possible benefits of treatment. However, it was sobering to hear Sharpless further suggest that oncologists are simply uncomfortable with words like “cure” and “hope” even though patients crave them.

If oncologists use these terms infrequently, such caution may not be entirely warranted. With regard to “cure,” data from the American Cancer Society indicate that survival has steadily improved for almost thirty years, for nearly all common malignancies.\(^2\) For instance, the overall annual cancer death rate dropped continuously from 1991 to 2017 by a total of 29%. In the United States, approximately 2.5 million fewer people have died of cancer during the past three decades than would have died if cure rates had remained unchanged. But have oncologists been willing to acknowledge this reality to their patients and among themselves?

“Hope,” for its part, is no longer an amorphous concept, having been rigorously investigated with validated tools during the same three-decade period.\(^3,4\) Specifically, an operationalized model known as “Hope Theory” has emerged that conceptualizes hope as a goal-directed construct. Given that goals consist of anything that an individual desires to do, be, get, or experience, hope matters in virtually every context and stage of life. In its absence, patients are often beset by emotional distress and decreased ability to cope with physical symptoms, while healthcare providers may be at risk for burnout.\(^5,6,7\) Given Sharpless’s comments, however, it is important to note that hope need not be focused solely on goals.
related to cure or prolongation of life. In fact, it may be desirable to re-direct patients
diagnosed with malignant disease toward non-cancer-related hopes that are important to
them, even when cure is unlikely.8,9

But, are oncologists indeed reluctant to use the terms “cure” and “hope”? To answer
this question in a data-driven manner, we performed quantitative bibliometric analyses of
trends in the published literatures of two high-impact oncology journals.

METHODS:

The journals JAMA Oncology (JAMAoncol) and the Journal of Clinical Oncology
(JCO) were selected for analysis not only because of their high impact but also because they
both regularly publish articles in three categories: primary research (“Original Investigations”
in JAMAoncol; “Original Reports” in JCO), editorials (“Viewpoints” in JAMAoncol;
“Editorials” in JCO) and narrative essays (“Cancer Care Chronicles” in JAMAoncol; “Art of
Oncology” in JCO). In JAMAoncol, narrative essays are defined10 as “personal vignettes
taken from wide ranging experiences in medicine,” and in JCO such essays are intended to11
“explore the experience of suffering from cancer or caring for people with cancer.” Editorials
in JAMAoncol are defined as “opinions that address any important topic in medicine, public
health, research, discovery, prevention, ethics, health policy or health law.” A strict definition
of editorials is not provided in the “Information for Authors” section of JCO. To avoid
confusion, we will use the terms primary research articles (PR), editorials (ED), and narrative
essays (NE) to refer to the above categories, regardless of journal.

We analyzed usage patterns of the words “hope” and “cure” in all articles appearing
since the inception of these journals’ respective narrative sections. Accordingly, for JCO, we
examined a 19-year period from 2000-2018 (12,604 articles total), and for JAMAoncol, a 5-
year period from 2015 through 2019 (759 articles total). We obtained raw text of all articles
in electronic format and performed a series of two-proportion Z-tests using the StatsModels module\textsuperscript{12} in Python. These analyses yielded comparisons across all three categories (PR, ED, NE) of the proportion of articles that mentioned “hope” or “cure” at least once in their text as well as the total number of sentences containing these words. All p-values are two-sided, with initial critical values for statistical significance set at .05. However, given that we performed multiple comparisons, Bonferroni correction was used, resulting in a corrected critical value for statistical significance of .008 for each set of analyses.

For reasons we discuss in detail below, we expected that a greater proportion of NE articles than PR or ED articles would mention the words “hope” and/or “cure,” and a greater proportion of ED than PR pieces would mention these target words. Because it is possible that articles in any of these categories could mention a target word but not use it frequently, we also analyzed the proportion of total sentences containing these words, expecting a parallel pattern.

**RESULTS:**

Results were nearly identical for the two journals, with only minor exceptions. Table 1 portrays article-level statistics. As expected, in both journals, “hope” was mentioned at least once in the text of a greater proportion of NE than ED or PR articles, and in a greater proportion of ED than PR articles. Also in both journals, “cure” was mentioned at least once in the text of a greater proportion of both NE and ED articles than PR articles (the NE-PR comparison was approaching statistical significance). Only in *JCO*, however, was “cure” used in a greater proportion of NE than ED articles. Findings were similar at the sentence level (Table 2).
Of note, we also found evidence of diminishing use of the terms “cure” and “hope” over time (see Tables 3 and 4). Analyses evaluating this issue were only performed on articles from JCO, given the longer timespan of available data (2000-2018). Specifically, we divided the articles into four time periods and performed a series of Cochran-Armitage trend analyses to test for historical change. Although most of these analyses yielded statistically non-statistically significant results, there were a number of exceptions to this rule. At the article level, the proportion of pieces containing the word “cure” statistically significantly decreased over time in both the NE (p = .004) and PR categories (p < .001). At the sentence level, the proportion of sentences containing the word “cure” statistically significantly decreased over time in both the ED (p < .001) and PR (p < .001) categories, as did the proportion of sentences containing the word “hope” in the PR category (p < .001). Thus, despite the improving trends in oncologic outcomes over time, professionals seem less likely to mention both “hope” and “cure” in published work.

**DISCUSSION:**

Bibliometric analyses like those reported here are known and accepted methods for gauging trends in a field. Nonetheless, like any methodology, they are imperfect. For instance, it is difficult, if not impossible, to determine the exact meaning of every mention of “hope” and “cure” in the 13,363 articles represented in our analysis. For this, nearly prohibitively detailed qualitative analysis of every instance would be necessary. Moreover, alternative interpretations of our findings must be entertained. Does the relative absence of “hope” and “cure” from written communication indicate commensurate disinclination to speak these words with patients? Does use of “hope” and “cure” differ between academic investigators—who author most articles—and practitioners who deliver care outside of academic settings? Do people have differing conceptions of the terms “hope” and “cure”?14
As several authors have noted, despite attempts to define “cure” for patients with cancer, the term is used heterogeneously in the oncology literature.\textsuperscript{15,16} We see these as questions worthy of further investigation.

Placing our three article categories on a continuum of descending scientific content, authors appear less likely to use “cure” and “hope” in more empirically rigorous primary research articles than editorial or narrative pieces. These results may not seem surprising, though the implications are potentially far-reaching. Divergent explanations exist: First, “cure” and “hope” might not be taken seriously by oncologists and therefore not incorporated into primary research articles. Conversely, heightened respect could be attached to these terms, such that authors do not feel they are appropriate in manuscripts where primary research is reported. Or, it may simply be that cure and hope are often omitted from primary research articles because they are not designated as outcome measures in the investigations typically reported in these two journals. Another viewpoint is that the narrative essay—a genre that, by design, enables authors to be reflective—is likely to be enriched by concepts like hope, which people may consider meaningful but are reluctant to mention in more professional contexts, given the perception that they are overly abstract or sentimental.

Regardless, our findings are consistent with Dr. Sharpless’s commentary about reluctance to use these terms despite improving survival rates for patients and the growing understanding of hope as a construct that can be rigorously measured and is not merely synonymous with the possibility of cure.\textsuperscript{2,3} In the future, we propose further exploration of this hypothesis in the literatures of related specialties such as geriatrics or intensive care, and of other healthcare professions such as nursing or social work.

In the meantime, physicians caring for patients with cancer may wish to re-acquaint themselves with the accomplishments of their colleagues\textsuperscript{2} to appreciate the instances where
cure is achievable, while simultaneously broadening their definition of hope when cure is elusive. Perhaps the time has come to judiciously embrace the words cure and hope.

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Table 1. Article-Level Descriptive Statistics and Comparisons

| Journal                | Article Category | Total No. of Articles | No. (%) of Articles Mentioning “Cure” | No. (%) of Articles Mentioning “Hope” | Comparisons for Each Target Word | Z-Score | P*       |
|------------------------|------------------|-----------------------|---------------------------------------|----------------------------------------|----------------------------------|---------|----------|
| Journal of Clinical Oncology | NE               | 300                   | 117 (39.0)                            | 180 (60.0)                             | Cure: NE > ED                    | 6.83    | < .001   |
|                        |                  |                       |                                       |                                        | Hope: NE > ED                    | 16.35   | < .001   |
|                        | ED               | 1,748                 | 365 (20.9)                            | 295 (16.9)                             | Cure: ED > PR                    | 3.84    | < .001   |
|                        |                  |                       |                                       |                                        | Hope: ED > PR                    | 12.34   | < .001   |
|                        | PR               | 10,556                | 1,805 (17.1)                          | 817 (7.7)                              | Cure: PR < NE                    | -9.80   | < .001   |
|                        |                  |                       |                                       |                                        | Hope: PR < NE                    | -30.91  | < .001   |
| JAMA Oncology          | NE               | 43                    | 10 (23.3)                             | 18 (41.9)                              | Cure: NE = ED                    | 0.07    | .94      |
|                        |                  |                       |                                       |                                        | Hope: NE > ED                    | 3.26    | < .001   |
|                        | ED               | 164                   | 39 (23.8)                             | 30 (18.3)                              | Cure: ED > PR                    | 3.00    | .003     |
|                        |                  |                       |                                       |                                        | Hope: ED > PR                    | 2.82    | .005     |
|                        | PR               | 552                   | 77 (14.0)                             | 56 (10.1)                              | Cure: PR < NE                    | -1.66   | .096     |
|                        |                  |                       |                                       |                                        | Hope: PR < NE                    | -6.07   | < .001   |

*Two-proportion Z-tests; two-sided p-values given.
PR = primary research; ED = editorial; NE = narrative essay
Table 2. Sentence-Level Descriptive Statistics and Comparisons*

| Journal of Clinical Oncology | NE  | 31,444 | 298 (1.0) | 719 (2.3) | Cure: NE > ED | Z-Score: 13.22 P* < .001 |
|-----------------------------|-----|--------|-----------|-----------|---------------|---------------------|
|                             | ED  | 172,383| 672 (.4)  | 391 (.2)  | Cure: ED > PR | Z-Score: 37.92 P* < .001 |
|                             | PR  | 4,335,756| 3,963 (.09)| 1,406 (.03)| Cure: PR < NE | Z-Score: -48.46 P* < .001 |
| JAMA Oncology               | NE  | 3,466  | 25 (.7)   | 66 (1.9)  | Cure: NE = ED | Z-Score: 0.91 P* .36 |
|                             | ED  | 9,825  | 87 (.9)   | 37 (.4)   | Cure: ED > PR | Z-Score: 17.90 P* < .001 |
|                             | PR  | 119,456| 133 (.1)  | 96 (.08)  | Cure: PR < NE | Z-Score: -9.88 P* < .001 |

*Two-proportion Z-tests; two-sided p-values given.

PR = primary research; ED = editorial; NE = narrative essay

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Table 3. Article-Level Historical Trends in the *JCO*

| Article Category | Year         | Total No of Articles | No. (%) of Articles Mentioning “Cure” | No. (%) of Articles Mentioning “Hope” |
|------------------|--------------|----------------------|---------------------------------------|---------------------------------------|
| Narrative Essay  | 2000-2004    | 66                   | 35 (53.0)                             | 35 (53.0)                             |
|                  | 2005-2009    | 85                   | 30 (35.3)                             | 58 (68.2)                             |
|                  | 2010-2014    | 87                   | 31 (35.6)                             | 49 (56.3)                             |
|                  | 2015-2018    | 62                   | 21 (33.9)                             | 38 (61.3)                             |
| Editorial        | 2000-2004    | 280                  | 74 (26.4)                             | 42 (15.0)                             |
|                  | 2005-2009    | 608                  | 113 (18.6)                            | 105 (17.3)                            |
|                  | 2010-2014    | 541                  | 121 (22.4)                            | 104 (19.2)                            |
|                  | 2015-2018    | 319                  | 57 (17.9)                             | 44 (13.8)                             |
| Primary Research | 2000-2004    | 2,579                | 577 (22.4)                            | 195 (7.6)                             |
|                  | 2005-2009    | 3,552                | 584 (16.4)                            | 277 (7.8)                             |
|                  | 2010-2014    | 3,025                | 427 (14.1)                            | 225 (7.4)                             |
|                  | 2015-2018    | 1,400                | 217 (15.5)                            | 120 (8.6)                             |
Table 4

Sentence-Level Historical Trends in the *JCO*

| Article Category | Year     | Total No. of Sentences | No. (%) of Sentences with Word “Cure” | No. (%) of Sentences with Word “Hope” |
|------------------|----------|------------------------|---------------------------------------|----------------------------------------|
|                  | 2000-2004 | 8,304                  | 104 (1.3)                             | 187 (2.3)                              |
| Narrative Essay  | 2005-2009 | 9,954                  | 79 (.8)                               | 238 (2.4)                              |
|                  | 2010-2014 | 7,445                  | 69 (.9)                               | 215 (2.9)                              |
|                  | 2015-2018 | 5,741                  | 52 (.9)                               | 92 (1.6)                               |
| Editorial        | 2000-2004 | 27,988                 | 158 (.6)                              | 70 /.3                                 |
|                  | 2005-2009 | 60,687                 | 239 (.4)                              | 166 (.3)                               |
|                  | 2010-2014 | 49,882                 | 230 (.5)                              | 153 (.3)                               |
|                  | 2015-2018 | 33,826                 | 98 /.3                                | 62 (.2)                                |
| Primary Research | 2000-2004 | 966,541                | 1438 (.2)                             | 579 (.06)                              |
|                  | 2005-2009 | 1,489,180              | 1529 (.1)                             | 873 (.06)                              |
|                  | 2010-2014 | 1,246,093              | 1,121 (.09)                           | 611 (.05)                              |
|                  | 2015-2018 | 633,942                | 506 (.08)                             | 275 (.04)                              |